Manipulating Mouse Embryo Laboratory Manual Third Edition

HAILEY OCONNOR

WHO Laboratory Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction Cambridge University Press
New imaging technologies have revolutionized the study of developmental biology. Where researchers once struggled to connect events at static timepoints, imaging tools now offer the ability to visualize the dynamic form and function of molecules, cells, tissues, and whole embryos throughout the entire developmental process. Imaging in Developmental Biology: A Laboratory Manual, a new volume in Cold Spring Harbor Laboratory Press' Imaging series, presents a comprehensive set of essential visualization methods. The manual features primers on live imaging of a variety of standard model organisms including C. elegans, Drosophila, zebrafish, Xenopus, avian species, and mouse. Further techniques are organized by the level of visualization they provide, from cells to tissues and organs to whole embryos. Methods range from the basics of labeling cells to cutting-edge protocols for high-speed imaging, optical projection tomography, and digital scanned laser light-sheet fluorescence. Imaging has become a required methodology for developmental biologists, and Imaging in Developmental Biology: A Laboratory Manual provides the detailed explanations and instructions for mastering these necessary techniques.
Drosophila Neurobiology Springer Science & Business Media
Mouse Genetics offers for the first time in a single comprehensive volume a practical guide to mouse breeding and genetics. Nearly all human genes are present in the mouse genome, making it an ideal organism for genetic analyses of both normal and abnormal aspects of human biology. Written as a convenient reference, this book provides a complete description of the laboratory mouse, the tools used in analysis, and procedures for carrying out genetic studies, along with background material and statistical information for use in ongoing data analysis. It thus serves two purposes, first to provide students with an introduction to the mouse as a model system for genetic analysis, and to give practicing scientists a detailed guide for performing breeding studies and interpreting experimental results. All topics are developed completely, with full explanations of critical concepts in genetics and molecular biology. As investigators around the world are rediscovering both the heuristic and practical value of the mouse genome, the demand for a succinct introduction to the subject has never been greater. Mouse Genetics is intended to meet the needs of this wide audience.
The Guide to Investigation of Mouse Pregnancy Cambridge University Press
This volume explores the latest techniques used to study and understand chromatin reprogramming in embryos and germ cells. Various culture systems are presented, which consist of invaluable tools to investigate many developmental processes. This book also looks at methods for direct examination of DNA, RNA, and proteins in embryos, along with low-input and single-cell assays for exploring these features at the genome-wide scale. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Cutting-edge and thorough,

Epigenetics Reprogramming During Mouse Embryogenesis: Methods and Protocols is a valuable resource for any scientist and researcher looking to make new discoveries in this fascinating field of chromatin reprogramming.

How to Integrate Exceptional Care with Cutting-Edge Technology CRC Press

Expanding on the National Research Councilâ€™s Guide for the Care and Use of Laboratory Animals, this book deals specifically with mammals in neuroscience and behavioral research laboratories. It offers flexible guidelines for the care of these animals, and guidance on adapting these guidelines to various situations without hindering the research process. Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research offers a more in-depth treatment of concerns specific to these disciplines than any previous guide on animal care and use. It treats on such important subjects as: The important role that the researcher and veterinarian play in developing animal protocols. Methods for assessing and ensuring an animalâ€™s well-being. General animal-care elements as they apply to neuroscience and behavioral research, and common animal welfare challenges this research can pose. The use of professional judgment and careful interpretation of regulations and guidelines to develop performance standards ensuring animal well-being and high-quality research. Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research treats the development and evaluation of animal-use protocols as a decision-making process, not just a decision. To this end, it presents the most current, in-depth information about the best practices for animal care and use, as they pertain to the intricacies of neuroscience and behavioral research.

Drosophila Protocols Cold Spring Harbor Laboratory Press

Genetically very similar to the human species, mice play an important role in biomedical research and have served as experimental models for a wide variety of pathologies, including cancer, cardiovascular diseases, and behavioral disorders. In Transgenic Mouse Methods and Protocols, Marten Hofker and Jan van Deursen have assembled a multidisciplinary collection of readily reproducible methods for working with mice, and particularly for generating mouse models that will enable us to better understand gene function. Described in step-by-step detail by highly experienced investigators, these proven techniques include new methods for conditional, induced knockout, and transgenic mice, as well as for working with mice in such important research areas as immunology, cancer, and atherosclerosis. Such alternative strategies as random mutagenesis and viral gene transduction for studying gene function in the mouse are also presented. Care is taken to make clear the details of the available approaches, as well as their limitations. Up-to-date and highly practical, Transgenic Mouse Methods and Protocols demonstrates clearly for both novice and expert investigators how to make novel transgenic mouse models, and how to use them effectively to understand the role of gene function in human health and disease.

A Laboratory Manual CSHL Press

The generation of mutant mice raises many questions about the best means of phenotypic analysis, breeding, and maintenance. The answers are now available from two experts with a wealth of detailed knowledge never previously assembled in one volume. Informal and highly practical, this handbook provides stepâ€“byâ€“step methods for troubleshooting experiments, from the basics of gene targeting through the analysis of postnatal effects.

Microbial and Phenotypic Definition of Rats and Mice Cambridge University Press

The Guide to Investigation of Mouse Pregnancy is the first publication to cover the mouse placenta or the angiogenic tree the mother develops to support the placenta. This much-needed resource covers monitoring of the cardiovascular system, gestational programming of chronic adult disease, epigenetic regulation, gene imprinting, and stem cells. Offering detailed and integrated information on how drugs, biologics, stress, and manipulations impact pregnancy in the mouse model, this reference highlights techniques used to analyze mouse pregnancy. Joining the ranks of much referenced mouse resources, The Guide to Investigation of Mouse Pregnancy is the only manual providing needed content on pregnancy in animal models for translational medicine and research. Provides instruction on how to collect pre-clinical data on pregnancy in mouse models for eventual use in human applications Describes the angiogenic tree the mother’s uterus develops to support pregnancy and the monitoring of pregnancy-induced cardiovascular changes Educates readers on placental cell lineages, decidual development including immune cells, epigenetic regulation, gene imprinting, stem cells, birth and lactation Discusses how stress, environmental toxicants and other manipulations impact upon placental function and pregnancy success

Imaging in Developmental Biology Academic Press

The establishment of microinjection protocols about 20 years ago for cultured cells and shortly thereafter for the generation of transgenic mice by microinjection of DNA into fertilized mouse eggs greatly influ enced many fields of biology. Not only have the data generated using these approaches contributed to a large extent to our present under standing of gene regulation and cellular function of higher eukaryotic cells, but current knowledge and future developments in this area will certainly have a great impact on basic and applied research for many years to come. This laboratory manual describes the current state of the art in this research area and focuses primarily on both the experimental strategies with an extensive bibliography and the detailed procedures. A large number of studies are presently being performed and a great variety of new experimental designs are rapidly being developed. The book con tains protocols on injection of somatic cells as well as on injection of embryos, the use of similar equipment being a common feature. In the articles dedicated to somatic cells, full descriptions of the manual and automatic injection systems are given as well as the methods for the analysis of injected cells by video-microscopy, electron microscopy or in situ hybridizations. In addition, comprehensive protocols are given for injection experiments with very different purposes, such as to study sig nal transduction or microtubule dynamics.

Manipulating the Mouse Embryo University of California Press

Mice have long been recognized as a valuable tool for investigating the genetic and physiological bases of human diseases such as diabetes, infectious disease, cancer, heart disease, and a wide array of neurological disorders. With the advent of transgenic and other genetic engineering technologies, the versatility and usefulness of the mouse as a

The Laboratory Mouse National Academies Press

Scientific Frontiers in Developmental Toxicology and Risk Assessment reviews advances made during the last 10-15 years in fields such as developmental biology, molecular biology, and genetics. It describes a novel approach for how these advances might be used in combination with existing methodologies to further the understanding of mechanisms of developmental toxicity, to improve the assessment of chemicals for their ability to cause developmental toxicity, and to improve risk assessment for developmental defects. For example, based on the recent advances, even the smallest, simplest laboratory animals such as the fruit fly, roundworm, and zebrafish might be able to serve as developmental toxicological models for human biological systems. Use of such organisms might allow for rapid and inexpensive testing of large numbers of chemicals for their potential to cause developmental toxicity; presently, there are little or no developmental toxicity data available for the majority of natural and manufactured chemicals in use. This new approach to developmental toxicology and risk assessment will require simultaneous research on several fronts by experts from multiple scientific disciplines, including developmental toxicologists, developmental biologists, geneticists, epidemiologists, and biostatisticians.

Concepts and Applications CSHL Press

"A subject collection from Cold Spring Harbor perspectives in biology."

A Laboratory Guide National Academies Press

A Laboratory Guide to the Tight Junction offers broad coverage of the unique methods required to investigate its characteristics. The methods are described in detail, including its biochemical and biophysical principles, step-by-step process, data analysis, troubleshooting, and optimization. The coverage includes various cell, tissue, and animal models. Chapter 1 provides the foundations of cell biology of tight junction. Chapter 2 covers the Biochemical approaches for paracellular channels and is followed by chapter 3 providing the Biophysical approaches. Chapter 4 describes and discusses Histological approaches for tissue fixation and preparation. Chapter 5 discusses Light microscopy, while chapter 6 presents Electron microscopic approaches. Chapter 7 covers Transgenic manipulation in cell cultures, including DNA and siRNA, Mutagenesis, and viral infection. Chapter 8 covers transgenic manipulation in mice, including: Knockout, Knockin, siRNA knockdown, GFP/LacZ reporter, and overexpression. The final chapter discusses the future developments of new approaches for tight junction research. Researchers and advanced students in bioscience working on topics of cell junction, ion channel and membrane protein will benefit from the described methods. Clinicians and pathologists interested in tissue barrier diseases will also benefit from the biochemical and biophysical characterization of tight junctions in organ systems, and their connection to human diseases. Provides consistent and detailed research methods Covers various cell, tissue and animal models Includes step-by-step guidance from beginner to sophisticated levels

Guidelines for Human Embryonic Stem Cell Research Academic Press

Introduction to immunochemistry for molecular biologists and other nonspecialists. Spiral.

A Practical Approach Springer Science & Business Media

Manipulating the Mouse EmbryoA Laboratory ManualCold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory Press

Scientific Frontiers in Developmental Toxicology and Risk Assessment Academic Press

The first two editions of this manual have been mainstays of molecular biology for nearly twenty years, with an unrivalled reputation for reliability, accuracy, and clarity. In this new edition, authors Joseph Sambrook and David Russell have completely updated the book, revising every protocol and adding a mass of new material, to broaden its scope and maintain its unbeatable value for studies in genetics, molecular cell biology, developmental biology, microbiology, neuroscience, and immunology. Handsomely redesigned and presented in new bindings of proven durability, this three-volume work is essential for everyone using today's biomolecular techniques. The opening chapters describe essential techniques, some well-established, some new, that are used every day in the best laboratories for isolating, analyzing and cloning DNA molecules, both large and small. These are followed by chapters on cDNA cloning and exon trapping, amplification of DNA, generation and use of nucleic acid probes, mutagenesis, and DNA sequencing. The concluding chapters deal with methods to screen expression libraries, express cloned genes in both prokaryotes and eukaryotic cells, analyze transcripts and proteins, and detect protein-protein interactions. The Appendix is a compendium of reagents, vectors, media, technical suppliers, kits, electronic resources and other essential information. As in earlier editions, this is the only manual that explains how to achieve success in cloning and provides a wealth of information about why techniques work, how they were first developed, and how they have evolved.

A Handbook of Mutation Analysis CSHL Press

An easy to read, practical description of the human IVF laboratory, from laboratory start-up and training to complex, specialized procedures.

A Laboratory Manual Humana

The fully revised and updated second edition of this practical handbook provides comprehensive coverage of all aspects of subfertility, including treatment and diagnosis. Each chapter is written by a recognized world expert in the field and, together, they aim to provide state of the art answers to all the problems of subfertility in a single volume. The introductory chapter provides a flow-chart approach to systematic diagnosis and treatment. Clearly written and easy to read, the subsequent chapters describe what questions to ask, how to investigate, and what each treatment requires. With an expanded international team of authors, this new edition also offers new chapters devoted to third party reproduction and in vitro maturation of oocytes. From medical students studying for examinations to consultant physicians, this volume is a 'must-have' reference for anyone dealing with couples who have fertility problems.

Mouse Development Cambridge University Press

An essential resource for reproduction professionals wishing to understand patient-centered advanced technologies now and in the future.

Lung Stem Cells in Development, Health and Disease Oxford University Press

"The first Lab Ref volume compiled recipes and reference data drawn from a selection of our manuals and was intended to save time and spare frustration." ... "In the same spirit, Lab Ref 2 again assembles in one place a new selection of reference information that should maximize the volume's value in a crowded laboratory environment."--Note.

Strategies and Protocols Manipulating the Mouse EmbryoA Laboratory Manual

This exceptional laboratory manual describes thirty-seven procedures most likely to be used in the next decade for molecular, biochemical, and cellular studies on Drosophila. They were selected after extensive consultation with the research community and rigorously edited for clarity, uniformity, and conciseness.The methods included permit investigation of chromosomes, cell biology, molecular biology, genomes, biochemistry, and development. Each protocol includes the basic information needed by novices, with sufficient detail to be valuable to experienced investigators. Each method is carefully introduced and illustrated with figures, tables, illustrations, and examples of the data obtainable. The book's appendices include key aspects of Drosophila biology, essential solutions, buffers, and recipes.An evolution of Michael Ashburner's 1989 classic Drosophila: A Laboratory Manual, this book is an essential addition to the personal library of Drosophila investigators and an incomparable resource for other research groups with goals likely to require fly-based technical approaches.