Manipulating Mouse Embryo Laboratory Manual Third Edition

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SLADE BOWERS

Mouse Genetics and Transgenics Cambridge University 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.
Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research CSHL Press
Most organs in the adult human body are able to maintain themselves and undergo repair after injury; these processes are largely dependent on stem cells. In this Monograph, the Guest Editors bring together leading authors in the field to provide information about the different classes of stem cells present both in the developing and adult lung: where they are found, how they function in homeostasis and pathologic conditions, the mechanisms that regulate their behaviour, and how they may be harnessed for therapeutic purposes. The book focuses on stem cells in the mouse and human lung but also includes the ferret as an increasingly important new model organism. Chapters also discuss how lung tissue, including endogenous stem cells, can be generated in vitro from pluripotent stem cell lines. This state-of-the-art collection comprehensively covers one of the most exciting areas of respiratory science
Optimizing Performance and Outcomes Oxford University 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.
A Laboratory Manual OUP Oxford
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.

Molecular Embryology

National Academies 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

Human Stem Cell Manual Cambridge University Press

Transgenic animal technologies and the ability to introduce functional genes into animals have revolutionized our ability to address complex biomedical and biological questions. This well-illustrated handbook covers the technical aspects of gene transfer — from molecular methods to whole animal considerations — for important laboratory and domestic animal species. It describes methodologies as employed by leading laboratories and is a key resource for researchers, as well as a tool for training technicians and students. This second edition incorporates updates on a variety of genetic engineering technologies ranging from microinjection and ES cell transfer to nuclear transfer in a broad range of animal modeling systems. Contains a comprehensive collection of transgenic animal and

gene transfer methods Discusses background and introduction to techniques and animal systems Teaches practical step-by-step protocols Fully revised with updates to reflect state-of-the-art technology and associated changes to date

Drosophila Protocols Cambridge University Press

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

CRISPR-Cas Springer Science & Business Media

In Molecular Embryology, expert investigators provide a comprehensive guide to the cutting-edge methods used today across the dramatically growing field of vertebrate molecular embryology. These powerful techniques take advantage of the most commonly used vertebrate experimental models: murine embryos for their genetics, chick embryos for in vivo manipulation, zebrafish for mutagenesis, amphibian embryos, and nonvertebrate chordates. The major techniques of experimental molecular biology and the particular advantages of each different species are emphasized. Detailed, easy-to-follow protocols, together with relevant background information and helpful tips, optimize the methods for success. Molecular Embryology brings together in one volume all the major techniques and common experimental species needed to study the mechanisms of biological development in

vertebrates. Bound to become a standard reference in this field, the book makes it possible for experienced and novice researchers alike to move between embryos of diverse vertebrate classes as their project progresses, ensuring their ability to utilize the experimental advantages of different systems to address specific developmental questions.

A Laboratory Manual

Manipulating the Mouse EmbryoA Laboratory Manual

Amphibian embryos are supremely valuable in studies of early vertebrate development because they are large, handle easily, and can be obtained at many interesting stages. And of all the amphibians available for study, the most valuable is Xenopus laevis,which is easy to keep and ovulates at any time of year in response to simple hormone injections.

Xenopusembryos have been studied for years but this is a particularly exciting time for the field. Techniques have become available very recently that permit a previously impossible degree of manipulation of gene expression in intact embryos, as well as the ability to visualize the results of such manipulation. As a result, a sophisticated new understanding of Xenopusdevelopment has emerged, which ensures the species' continued prominent position among the organisms favored for biological investigation. This manual contains a comprehensive collection of protocols for the study

of early development in Xenopusembryos. It is written by several of the field’s most prominent investigators in the light of the experience they gained as instructors in an intensive laboratory course taught at Cold Spring Harbor Laboratory since 1991. As a result it contains pointers, hints, and other technical knowledge not readily available elsewhere. This volume is essential reading for all investigators interested in the developmental and cell biology of Xenopusand vertebrates generally. Many of the techniques described here are illustrated in an accompanying set of videotapeswhich are cross-referenced to the appropriate section of the manual.

Patterning, Morphogenesis, and Organogenesis Gulf Professional Publishing □□□□□□□□□:(□)M. □□□□ □□(□)K. □□□□□(□)R. □□□□

Strategies and Protocols CRC Press 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.

Methods and Protocols

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

Mouse Phenotypes

National Academies Press

The Laboratory Mouse, Second Edition is a comprehensive book written by international experts. With inclusions of the newly revised European standards on laboratory animals, this will be the most current, global authority on the care of mice in laboratory research. This well-illustrated edition offers new and updated chapters including immunology, viruses and parasites, behavior, enrichment and care standards of laboratory mice across the life sciences, medical and veterinary fields. Features four-color illustrations with complete instruction on mouse surgery, anatomy, behavior and care of the mouse in laboratory research Offers additional chapters on new mouse strains,

phenotyping of strains, bacteria and parasites, and immunology Includes the newly revised EU standards on care, as well as, comparisons to standards and regulations in the US and other countries

WHO Laboratory Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction Academic Press

Never before has there been such a comprehensive book of protocols. This compendium offers a full range of research techniques-from cell culture, to biochemical, to microscopic and genetic. More focused books, like Cold Spring Harbor's Manipulating the Mouse Embryo, are similar though more narrow in scope. This book will appeal to a broad range of researchers, from basic experimental scientists to clinical and animal scientists.

A Laboratory Guide to the Mammalian Embryo Newnes

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

Manipulating the Mouse Embryo National Academies 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 Guide

National Academies Press

Since 1998, the volume of research being conducted using human embryonic stem (hES) cells has expanded primarily using

private funds because of restrictions on the use of federal funds for such research. Given limited federal involvement, privately funded hES cell research has thus far been carried out under a patchwork of existing regulations, many of which were not designed with this research specifically in mind. In addition, hES cell research touches on many ethical, legal, scientific, and policy issues that are of concern to the public. This report provides guidelines for the conduct of hES cell research to address both ethical and scientific concerns. The guidelines are intended to enhance the integrity of privately funded hES cell research by encouraging responsible practices in the conduct of that research.

The Laboratory Mouse
Cambridge University Press
An easy to read, practical description of the human IVF laboratory, from laboratory start-up and training to complex, specialized procedures.

A Clinician's Guide
European Respiratory Society
A unique book that integrates knowledge from a wide range of expertise, specifically applied to the mouse, and addressed at a wide audience from those new to the field to experts who want an update on the state of the art. Mouse Genetics and Transgenics: APA covers all aspects of using the mouse as a genetic model organism: care & husbandry; archiving stocks as frozen embryos or sperm; making new mutations by

chemical mutagenesis; transgenesis; and gene targetting; mapping mutations and polygenic traits by cytogenetic, genetic, and physical means; and disseminating and researching information via the Internet.

Antibodies Cold Spring Harbor, N.Y. : Cold Spring Harbor Laboratory 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.