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KEY=CELL - YAMILET HAILEY

Cell Imaging Techniques Springer Science & Business Media A diverse collection of state-of-the-art methods for the microscopic imaging of cells and molecules. The authors cover a wide spectrum of complimentary techniques, including such methods as fluorescence microscopy, electron microscopy, atomic force microscopy, and laser scanning cytometry. Additional readily reproducible protocols on confocal scanning laser microscopy, quantitative computer-assisted image analysis, laser-capture microdissection, microarray image scanning, near-field scanning optical microscopy, and reflection contrast microscopy round out this eclectic collection of cutting-edge imaging techniques now available. The authors also discuss preparative methods for particles and cells by transmission electron microscopy. Cell Imaging Techniques Methods and Protocols Humana Press Cell Imaging is rapidly evolving as new technologies and new imaging advances continue to be introduced. In the second edition of Cell Imaging Techniques: Methods and Protocols expands upon the previous editions with current techniques that includes confocal microscopy, transmission electron microscopy, atomic force microscopy, and laser microdissection. With new chapters covering colocalization analysis of fluorescent probes, correlative light and electron microscopy, environmental scanning electron microscopy, light sheet microscopy, intravital microscopy, high throughput microscopy, and stereological techniques. Written in the highly successful Methods in Molecular BiologyTM 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 Authoritative and cutting-edge, Cell Imaging Techniques: Methods and Protocols, Second Edition is an easily accessible volume of protocols to be used with a variety of imaging-based equipment likely available in a core imaging facility. Live Cell Imaging Methods and Protocols Humana Press Now a routine tool in biomedical and life science research, live cell imaging has made major progress enabling this core biochemical, cell, and molecular biology technique to become even more powerful, versatile, and affordable. In Live Cell Imaging: Methods and Protocols, a panel of expert contributors provide a comprehensive compendium of experimental approaches to live cell imaging in the form of several overview chapters followed by representative examples and case studies covering different aspects of the most current methodology. By examining a range of state-of-the-art protocols extensively validated in complex biological studies, this volume highlights new experimental and instrumental opportunities and helps researchers to select appropriate imaging methods for their specific biological questions and measurement tasks. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and cutting-edge, Live Cell Imaging: Methods and Protocols promises to contribute greatly to the further development and dissemination of this fundamentally important technology which spans across many disciplines including molecular and cell biology, chemistry, physics, optics, engineering, cell physiology, and medicine. Imaging and Tracking Stem Cells Methods and Protocols Humana Press Imaging and Tracking Stem Cells: Methods and Protocols gathers representative protocols related to the vital techniques of stem cell imaging and lineage tracing, including that of live cells, both in vivo and in vitro. The detailed chapters presented within have been validated for reproducibility and are described in an easy to follow, step-by-step fashion so as to be valuable for not only experts but also novices in the stem cell field. As with other volumes in the highly successful Methods in Molecular Biology series, chapters conclude with a Notes section, which provides tips on troubleshooting and avoiding known pitfalls. Authoritative and practical, Imaging and Tracking Stem Cells: Methods and Protocols provides both a flavor of the field as it currently is and a source to stimulate new approaches and methodologies by those interested in tracking stem cells and their progeny. Basic Methods in Microscopy Protocols and Concepts from Cells : a Laboratory Manual CSHL Press This manual contains selected material from Cells - a Laboratory Manual, as well as two chapters from Live Cell Imaging. It includes sections on microscopy, and on preparing and labelling specimens for microscopy. Confocal Microscopy Methods and Protocols Humana Press Confocal Microscopy: Methods and Protocols, Second Edition takes the researcher from the bench top through the imaging process, to the page. Protocols for the preparation of tissues from many model organisms including worms, flies and mice have been included as well as chapters on confocal imaging of living cells, three dimensional analysis, and the measurement and presentation of confocal images for publication. Emphasis has been placed on the laser scanning confocal microscope since this is still the instrument used for most routine applications. The current generation of modern confocal instruments produces optical sections of cells and tissues that are free of out-of-focus fluorescence with reduced chances of artifacts from the techniques of specimen preparation. This allows the imaging of living specimens and measurements of physiological events within cells. Confocal microscopy has become essential in many fields of contemporary biomedical research where a light microscope is required for imaging fluorescently labeled cells and tissues, especially cell biology, developmental biology, neurobiology, and pathology. Written in the 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 protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and easily accessible, Confocal Microscopy: Methods and Protocols, Second Edition is aimed primarily, but not exclusively, at the novice user with pointers to more advanced techniques. Imaging Flow Cytometry Methods and Protocols Humana Press This detailed volume for the first time explores techniques and protocols involving quantitative imaging flow cytometry (IFC), which has revolutionized our ability to analyze cells, cellular clusters, and populations in a remarkable fashion. Beginning with an introduction to technology, the book continues with sections addressing protocols for studies on the cell nucleus, nucleic acids, and FISH techniques using an IFC instrument, immune response analysis and drug screening, IFC protocols for apoptosis and cell death analysis, as well as morphological analysis and the identification of rare cells. Written for the highly successful Methods in Molecular Biology series, 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. Authoritative and practical, Imaging Flow Cytometry: Methods and Protocols will be a critical source for all laboratories seeking to implement IFC in their research studies. Multiplexed Imaging Methods and Protocols Humana This volume provides a collection of state-of-the-art approaches addressing key aspects of multiplexed imaging. Chapters focus on labeling and imaging techniques for multiplexed imaging, as well as on the application of these techniques for the study of cells and tissues. 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. Authoritative and practical, Multiplexed Imaging: Methods and Protocols aims to be helpful for researchers interested in implementing multiplexed imaging or in developing novel, cutting-edge multiplexed imaging approaches. Light Microscopy Methods and Protocols Humana Press Of all scientific instruments, probably none has had more applications in the life sciences than the light microscope. In Light Microscopy: Methods and Protocols, expert researchers explore the basics and the latest advances in microscope instrumentation, sample preparation, and imaging techniques, all of which have been producing fundamental insights into the functions of cells and tissues. Chapters cover a variety of bright field and fluorescence microscopy-based approaches that are central to the study of a range of biological questions, providing information on how to prepare cells and tissues for microscopic investigations, covering detailed staining procedures, and exploring methods to analyze images and interpret the results accurately. Composed in the highly successful Methods in Molecular BiologyTM series format, each chapter contains a brief introduction, step-by-step methods, a list of necessary materials, and a Notes section which shares tips on troubleshooting and avoiding known pitfalls. Comprehensive and current, Light Microscopy: Methods and Protocols is an essential handbook for all researchers who are exploring the intriguing microscopic world of the cell. Imaging Gene Expression Methods and Protocols Humana Press As imaging technologies and approaches have evolved, the scope of certain imaging techniques has moved far beyond the production of purely illustrative images or appealing time-lapse movies to providing the scientist with a rich range of ways to measure and quantify the biological process and outcome of gene expression. In Imaging Gene Expression: Methods and Protocols, expert authors offer up-to-date approaches and protocols that scientists in the field have developed, which would benefit the broader scientific community. Divided in three convenient parts, this detailed book covers the output of a gene, namely the RNA molecules that are transcribed from the gene and the way by which these molecules can be tracked or quantified in fixed or living cells, protocols that focus on the gene, DNA, or chromatin, as well as a variety of ways by which nuclear processes intertwined with gene expression can be followed and quantified in living cells as well as approaches for studying several sub-nuclear structures found in eukaryotic cells. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective subjects, lists of materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and up-to-date, Imaging Gene Expression: Methods and Protocols will serve researchers working toward imaging in the context of complete organisms. Cell Tracking Methods and Protocols Humana This volume details methods used to track cells in the body and will serve as a reference for preclinical and clinical researchers in the fields of medicine and biomedical science. Chapters guide readers through protocols on bioluminescence imaging, fluorescence imaging, magnetic resonance imaging (MRI), ultrasound, computed tomography, and positron emission spectroscopy. 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. Authoritative and cutting-edge, Cell Tracking: Methods and Protocols aims to ensure successful results in the further study of this vital field. Nanoimaging Methods and Protocols Humana Press For more than a century, microscopy has been a centerpiece of extraordinary discoveries in biology. Along the way, remarkable imaging tools have been developed allowing scientists to dissect the complexity of cellular processes at the nano

length molecular scales. Nanoimaging: Methods and Protocols presents a diverse collection of microscopy techniques and methodologies that provides guidance to successfully image cellular molecular complexes at nanometer spatial resolution. The book's four parts cover: (1) light microscopy techniques with a special emphasis on methods that go beyond the classic diffraction-limited imaging; (2) electron microscopy techniques for high-resolution imaging of molecules, cells and tissues, in both two and three dimensions; (3) scanning probe microscopy techniques for imaging and probing macromolecular complexes and membrane surface topography; and (4) complementary techniques on correlative microscopy, soft x-ray tomography and secondary ion mass spectrometry imaging. Written in the successful format of the Methods in Molecular BiologyTM series, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and accessible, Nanoimaging: Methods and Protocols highlights many of the most exciting possibilities in microscopy for the investigation of biological structures at the nano length molecular scales. Cell Imaging Techniques Humana Press A diverse collection of state-of-the-art methods for the microscopic imaging of cells and molecules. The authors cover a wide spectrum of complimentary techniques, including such methods as fluorescence microscopy, electron microscopy, atomic force microscopy, and laser scanning cytometry. Additional readily reproducible protocols on confocal scanning laser microscopy, quantitative computer-assisted image analysis, laser-capture microdissection, microarray image scanning, near-field scanning optical microscopy, and reflection contrast microscopy round out this eclectic collection of cutting-edge imaging techniques now available. The authors also discuss preparative methods for particles and cells by transmission electron microscopy. Cellular Heterogeneity Methods and Protocols Humana Press This volume is essential for anyone struggling with the cellular heterogeneity field, and it connects this new area with the latest advances in innovative techniques combined with practical advice from international experts. The chapters provide a comprehensive overview of cellular heterogeneity analysis techniques, exploring cytometry, imaging and spectroscopy methods, metabolic and molecular biological methods in tracking, as well as chromatin and cell cycle heterogeneity. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, detailed lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and key tips on troubleshooting and avoiding known pitfalls. Authoritative and accessible, Cellular Heterogeneity: Methods and Protocols encourages readers to explore new ways of studying cells that will help lead to exciting new discoveries. Imaging Flow Cytometry Methods and Protocols Humana Press This detailed volume for the first time explores techniques and protocols involving quantitative imaging flow cytometry (IFC), which has revolutionized our ability to analyze cells, cellular clusters, and populations in a remarkable fashion. Beginning with an introduction to technology, the book continues with sections addressing protocols for studies on the cell nucleus, nucleic acids, and FISH techniques using an IFC instrument, immune response analysis and drug screening, IFC protocols for apoptosis and cell death analysis, as well as morphological analysis and the identification of rare cells. Written for the highly successful Methods in Molecular Biology series, 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. Authoritative and practical, Imaging Flow Cytometry: Methods and Protocols will be a critical source for all laboratories seeking to implement IFC in their research studies. Cytoskeleton Methods and Protocols Humana Press In the ten years since the publication of the first edition, great advances in fluorescent labeling, optics, and sample preparation have significantly improved the imaging capability of microscopy, allowing for a continual refinement of our understanding of the cytoskeleton as a dynamic synergy of components. In Cytoskeleton Methods and Protocols, Second Edition, internationally renowned experts present techniques which reflect many of the recent technological advances in experimental tools for cytoskeleton research with emphasis on animal, plant, protist, and fungal model systems. This cutting-edge volume contains methods for live-cell imaging, fluorescence microscopy, electron microscopy, analysis of cell and organelle motility, isolation of cytoskeleton components, and proteomics, amongst other topics. As a volume in the highly successful Methods in Molecular BiologyTM series, chapters incorporate introductions to their respective subjects, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and notes that provide unpublished technical information on troubleshooting and avoiding known pitfalls. Up-to-date and comprehensive, Cytoskeleton Methods and Protocols, Second Edition serves as an ideal guide to scientists who wish to continue this fruitful and important biological research. In Vivo Fluorescence Imaging Methods and Protocols Humana Press This detailed volume includes a rich variety of applications using various instrumentations, probes, disease models, and targets in order to account for the multidisciplinary nature of the use of in vivo fluorescence imagine. The book also includes chapters on the emerging fields of cell tracking, image-guided treatment, and fluorescence imaging in the second NIR window, as well as protocols for evaluation methods before and after in vivo imaging. Written for the highly successful Methods in Molecular Biology series, chapters include brief 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. Authoritative and practical, In Vivo Fluorescence Imaging: Methods and Protocols serves as a valuable reference for researchers from numerous fields who wish to become more familiar with in vivo fluorescence imaging techniques. Detection of Cell Death Mechanisms Methods and Protocols Humana This volume provides detailed protocols for the performance, analysis, and troubleshooting of in vitro and in vivo experiments related to programmed cell death. Chapters compile conventional techniques such as western blot and qPCR and state-of-the art transmission electron microscopy and real-time multiplexed imaging assays. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, application details for both the expert and non-expert reader, and tips on troubleshooting and avoiding known pitfalls. Authoritative and accessible, Detection of Cell Death Mechanisms: Methods and Protocols aims to ensure seamless execution of protocols on specific cell death type. The ESCRT Complexes Methods and Protocols Springer Nature This detailed collection gathers both established and recent technical procedures to study the Endosomal Sorting Complex Required for Transport (ESCRT) complexes in a wide range of biological systems: Archaea, A. thaliana, U. maydis, S. cerevisiae, S. pombe, C. elegans, D. melanogaster, and mammalian cells. Opening with a section on imaging techniques, the book continues with chapters covering biochemical approaches presenting strategies for production and characterization of recombinant ESCRT proteins, or of specific ESCRT protein domains, as well as genetic and proteomic experimental approaches. Written for the highly successful Methods in Molecular Biology series, chapters include introduction 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. Authoritative and practical, The ESCRT Complexes: Methods and Protocols serves as a compact guide for researchers interested in establishing an integrated approach to investigate the ESCRT machinery functions in cell biology. Plant Cell Division Methods and Protocols Humana Press This volume aims to present a large panel of techniques for the study of Plant Cell Division. Plant Cell Division: Methods and Protocols captures basic experimental protocols that are commonly used to study plant cell division processes, as well as more innovative procedures. Chapters are split into five parts covering several different aspect of plant cell division such as, cell cultures for cell division studies, cell cycle progression and mitosis, imaging plant cell division, cell division and morphogenesis, and cytokinesis. Written for the Methods in Molecular Biology series, 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. Authoritative and practical, Plant Cell Division: Methods and Protocols is a valuable tool for the study of plant cell division at both the cellular and molecular levels, and in the context of plant development. Freshney's Culture of Animal Cells A Manual of Basic Technique and Specialized Applications John Wiley & Sons FRESHNEY’S CULTURE OF ANIMAL CELLS THE NEW EDITION OF THE LEADING TEXT ON THE BASIC METHODOLOGY OF CELL CULTURE, FULLY UPDATED TO REFLECT NEW APPLICATIONS INCLUDING IPSCS, CRISPR, AND ORGAN-ON-CHIP TECHNOLOGIES Freshney’s Culture of Animal Cells is the most comprehensive and up-to-date resource on the principles, techniques, equipment, and applications in the field of cell and tissue culture. Explaining both how to do tissue culture and why a technique is done in a particular way, this classic text covers the biology of cultured cells, how to select media and substrates, regulatory requirements, laboratory protocols, aseptic technique, experimental manipulation of animal cells, and much more. The eighth edition contains extensively revised material that reflects the latest techniques and emerging applications in cell culture, such as the use of CRISPR/Cas9 for gene editing and the adoption of chemically defined conditions for stem cell culture. A brand-new chapter examines the origin and evolution of cell lines, joined by a dedicated chapter on irreproducible research, its causes, and the importance of reproducibility and good cell culture practice. Throughout the book, updated chapters and protocols cover topics including live-cell imaging, 3D culture, scale-up and automation, microfluidics, high-throughput screening, and toxicity testing. This landmark text: Provides comprehensive single-volume coverage of basic skills and protocols, specialized techniques and applications, and new and emerging developments in the field Covers every essential area of animal cell culture, including lab design, disaster and contingency planning, safety, bioethics, media preparation, primary culture, mycoplasma and authentication testing, cell line characterization and cryopreservation, training, and troubleshooting Features a wealth of new content including protocols for gene delivery, iPSC generation and culture, and tumor spheroid formation Includes an updated and expanded companion website containing figures, artwork, and supplementary protocols to download and print The eighth edition of Freshney’s Culture of Animal Cells is an indispensable volume for anyone involved in the field, including undergraduate and graduate students, clinical and biopharmaceutical researchers, bioengineers, academic research scientists, and managers, technicians, and trainees working in cell biology, molecular biology, and genetics laboratories. Bone Research Protocols Humana Press Studies over the past decade have continued to bring tremendous advances to our understanding of bone biology. New pathways have been discovered and expanded our knowledge of the ways in which genes and gene products affect bone cells and thereby bone mass and bone strength. In Bone Research Protocols, Second Edition, expert researchers in the field detail many methods commonly used to study bone biology. Focusing mainly on in vitro methods, this volume gives techniques for isolation, culture and functional analysis of all bone cell types and details a range of imaging methods, including light and ultrastructural microscopy and live cell imaging. Some important in vivo techniques are included, such as analysis of bone resorption and imaging using X rays, fluorescent or luminescent techniques. Methods for study of proteins and nucleic acid are included and methods for analysis of bone composition, measurement of bone strength, and response to mechanical stimulation are described. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and key tips on troubleshooting and avoiding known pitfalls. Authoritative and practical, Bone Research Protocols, Second Edition seeks to aid scientists in the bone field to establish new techniques in their laboratories. Neuronal Cell Death Methods and Protocols Springer Nature This volume covers comprehensive methods on ways to assess structural and ultrastructural changes in the mitochondria, cytoskeleton, and microglia using state-of-the-art microscopy techniques including super-resolution imaging, electron microscopy, and ultra-high field MRI. The chapters in this book cover topics such as analysis of neurodegeneration in the post-mortem characterization of preclinical animal models, in vivo modeling in cell death in different model systems and brain organoids, single cell clonal analysis using Mosaic Analysis with Double Markers in genetic mouse models, and genome and proteomic methods for analysis of mRNA dynamics and quantitation of targeted peptides. 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, Neuronal Cell Death: Methods and Protocols is a valuable resource for any scientist and researcher interested in learning more about this developing field. Optical Imaging Techniques in Cell Biology, Second Edition CRC Press Optical Imaging Techniques in Cell Biology, Second Edition covers the field of biological microscopy, from the optics of the microscope to the latest advances in imaging below the

traditional resolution limit. It includes the techniques—such as labeling by immunofluorescence and fluorescent proteins—which have revolutionized cell biology. Quantitative techniques such as lifetime imaging, ratiometric measurement, and photoconversion are all covered in detail. Expanded with a new chapter and 40 new figures, the second edition has been updated to cover the latest developments in optical imaging techniques. Explanations throughout are accurate, detailed, but as far as possible non-mathematical. This edition includes appendices with useful practical protocols, references, and suggestions for further reading. Color figures are integrated throughout. Fluorescence Spectroscopy and Microscopy Methods and Protocols Humana Press Reflecting the expanding field's need for reliable protocols, Fluorescence Spectroscopy and Microscopy: Methods and Protocols offers techniques from a worldwide team of experts on this versatile and vital subject. The topics covered fall into four broad categories: steady-state fluorescence spectroscopy, time-resolved fluorescence spectroscopy, fluorescent probe development, and the various sub-categories of fluorescence microscopy, such as fluorescence recovery after photobleaching (FRAP), live cell FRET imaging (FRETim), fluorescence lifetime imaging (FLIM), fluorescence fluctuation spectroscopy (FFS), and single-molecule fluorescence spectroscopy (smFS). Written as a part of the popular Methods in Molecular Biology series, chapters include the kind of unambiguous detail and key implementation advice that proves essential for successful results. Comprehensive and practical, Fluorescence Spectroscopy and Microscopy: Methods and Protocols aims to guide both 'novice' and established scientists toward furthering their research with these invaluable techniques. Current Protocols Select Methods and Applications in Microscopy and Imaging John Wiley & Sons Compiled by editors with hands-on experience in microscopy, teaching, and protocol design and communication, this book provides a practical, bench-side guide to the various methods and applications of the advanced light microscope in the cell biology laboratory. It offers detailed step-by-step instructions written at a level that lets investigators employ even very sophisticated microscopy methods. The result is a resource for seasoned investigators and those new to the use of the microscope alike. Peroxisomes Methods and Protocols Humana Press This volume provides easily accessible and comprehensive collection of methods, techniques, and strategies to investigate the molecular and cellular biology of peroxisomes in different organisms. Chapters detail valuable instructions, guidelines and protocols for molecular cell biologists, biochemists and biomedical researchers with an interest in peroxisome biology. Chapters in Peroxisomes: Methods and Protocols illustrate the isolation of peroxisomes, investigation of properties of membrane proteins, protocols to investigate and manipulate peroxisomes in cellular systems, detection of peroxisomes, including immunofluorescence, cytochemistry, cryo-immuno electron microscopy, and live cell imaging approaches. Authoritative and practical, Peroxisomes: Methods and Protocols aims to be useful for those already working on peroxisomes as well as for those who would like to start working on this fascinating organelle. 3D Cell Culture Methods and Protocols Humana Press Developed for a range of tissues where the culture environment takes into account the spatial organization of the cells therein, 3D cell culture models serve to bridge the gap between in vivo studies at one extreme with that of simple cell monolayers at the other. In 3D Cell Culture: Methods and Protocols, international experts describe a number of basic and applied methodologies taken from a breadth of scientific and engineering disciplines, many of which deal with direct applications of 3D culture models, most notably in the formation of tissues for clinical purpose. Beginning with an overview of the biological and materials scaffold requirements for successfully creating 3D models, the book delves into topics such as general scaffold design and fabrication techniques, models for bone, skin, cartilage, nerve, bladder, and hair follicles, and chapters on bioreactor design, imaging, and stem cells. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include brief introductions to their respective subjects, lists of the necessary materials, step-by-step, readily reproducible laboratory protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and cutting-edge, 3D Cell Culture: Methods and Protocols serves as a basic manual for laboratory-based scientists who not only need to have a comprehensive range of techniques contained within a single text but also require techniques described using a standard, convenient format. Stem Cell Mobilization Methods and Protocols This book provides detailed state-of-the-art protocols for analyzing individual aspects of stem cell mobilization at the molecular and cellular level with contributions encompassing the most recent technological developments. Specifically, the volume covers cell adhesion and migration assays in three-dimensional models, imaging techniques for the determination of blood flow or hypoxic status, innovative biomechanical studies of stem cells, and assays to determine the involvement of proteases or complement factors, as well as other key topics. Written for the highly successful Methods in Molecular Biology series, 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. Authoritative and practical, Stem Cell Mobilization: Methods and Protocols is an ideal guide for all laboratories in their endeavors to decipher the mechanisms of stem cell mobilization, ultimately helping stem cell donors and patients around the world. Bacterial Cell Surfaces Methods and Protocols Humana Press In recent years, molecular microbiology has emerged as a top, cutting-edge biological discipline, thanks to the multi-disciplinary and integrative approaches taken by investigators seeking to understand the intricacies of the microbial world and how it affects human health and the biosphere. In Bacterial Cell Surfaces: Methods and Protocols, recent advances in structural biology, proteomics, and imaging techniques, together with the traditional biochemical and genetic approaches, are provided in order to present an exciting look into the structure, function, and regulation of the bacterial cell envelope. The detailed volume contains examples of traditional and innovative tools for the study of protein structure and function and enzymatic activities, the purification and analysis of macromolecules and their complexes, and the investigation of regulatory mechanisms and cell biological processes. Written in the highly successful Methods in Molecular BiologyTM 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. Authoritative and practical, Bacterial Cell Surfaces: Methods and Protocols is aimed at the microbiologist, biochemist, or cell biologist, whether a beginning graduate student or a veteran experimentalist, who wishes to learn new methodologies and take advantage of the years of research and protocol optimization from the best laboratories around the world. Cytotoxic T-Cells Methods and Protocols Humana This new edition explores lab protocols describing new techniques to study cytotoxic T-cells (CTLs), as well as chapters of a more general discursive nature, all with an emphasis on the use of systems biology in immunology. Beginning with phenotypical characterization of CTL populations, the volume continues with in vitro and in vivo cytotoxicity assays, methods to detect senescent T cells, in vivo and in vitro models to understand immune and bone cells cross-talk, microscopy and in vivo imaging, as well as "Omics" approaches and molecular methods, concluding with chapters on CTL involvement in transplantation and link microbiota-immunity. Written for the highly successful Methods in Molecular Biology series, chapters feature the kind of detail and key implementation advice for best results in the lab. Authoritative and up-to-date, Cytotoxic T-Cells: Methods and Protocols, Second Edition serves as an ideal guide for researchers working with these vital cells. T-Cell Motility Methods and Protocols Humana Press This volume discusses the latest developments in cellular, molecular, biochemical, and imaging assays to study the biology and functions of T-cells. The chapters in this book cover topics such as LFA-1/ICAM-1 interactions in T-cell motility; using 3D-SIM to dissect signaling cross-talks in motile T-cells; GapmeR-mediated gene silencing in motile T-cells; activity of cellular kinases in migrating T-cells; and computational analysis of protein-protein interactions in motile T-cells. 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 comprehensive, T-Cell Motility: Methods and Protocols is an essential resource for graduate students, postdoctoral fellows, and principal investigators working in the fields of immunology, T-cell biology, biochemistry, molecular biology, and imaging. Mammary Stem Cells Methods and Protocols Humana This second edition provides an overview of recent developments and approaches used by researchers to investigate the properties and functions of mammary epithelial and stem cells, which will contribute to understand the heterogeneity of the mammary gland and of breast cancer. Chapters detail processes used to characterize stem cells, single cell RNA sequencing, computational methods, sophisticated imaging techniques, and a variety of model systems, among others. 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. Authoritative and cutting-edge, Mammary Stem Cells: Methods and Protocols, Second Edition aims to make available protocols used to navigate the intricate behavior of mammary stem cells and to gain further knowledge to take us closer to the design of innovative strategies to prevent and treat breast cancer. Cell Polarity Signaling Methods and Protocols Humana This volume explores detailed methods to investigate various aspects of biology related to cell polarity, or asymmetry within a cell. Molecular, cellular, and tissue-level regulation and function as well as diseases caused by impairment of cell polarity are explored by these methods. Beginning with advanced imaging and biochemical methods, the book continues with planar cell polarity (PCP) signaling in morphogenesis in diverse developmental contexts, apicobasal (AB) cell polarity in development and diseases, as well as directional cell migration and biomechanics in cell polarity. The collection includes the usage of a wide variety of model systems and an extensive array of techniques, including genetic, imaging, biochemical, and biomechanical. Written for the highly successful Methods in Molecular Biology 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. Authoritative and comprehensive, Cell Polarity Signaling: Methods and Protocols aims to enable researchers to delve into the stimulating field of cell polarity and contribute to our understanding of how coordinated control of protein stability, trafficking, membrane retention, post-translational modification, and dynamic organization leads to active regulation of cell polarity. Chapter 29 is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com. Golgi Methods and Protocols Humana This volume provides readers with a collection of new and classical methods, techniques, and applications used to address enduring questions about the structure and functions of the Golgi complex. The chapters in this volume cover diverse topics ranging from model systems; live and fixed cell imaging techniques; in vitro biochemical reconstitution systems; and specific methods developed to study Golgi formation, maintenance, and functions under physiological and pathological conditions. 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 authoritative, Golgi: Methods and Protocols is a valuable tool for researchers in the field who wish to explore new areas of Golgi biology and for new investigators interested in exploring Golgi structure and function. Bioluminescence Methods and Protocols, Volume 1 Springer Nature This detailed collection explores recent advances in molecular imaging techniques involving bioluminescence, currently employed in biolaboratories around the world. Volume 1 delves into techniques for the establishment of luciferins and luciferases, basic in vitro and in vivo applications, as well as protocols on multiplex imaging platforms. Written for the highly successful Methods in Molecular Biology series, 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. Authoritative and comprehensive, Bioluminescence: Methods and Protocols, Fourth Edition, Volume 1 presents practical guidance for researchers and technical staff on how to proceed with bioluminescence studies in their laboratories. Extracellular Vesicles Methods and Protocols Humana Press This volume examines established methods and protocols to isolate and characterize extracellular vesicles (EVs) and their composition, among other techniques including purification, imaging, biofluid-specific and cell-specific isolation and downstream genomic and proteomic profiling. The international group of expert scientists who have contributed to this collection provide a variety of different techniques related to the growing assortment of EV applications, given that at times using only one technique or two is insufficient to address the question at hand. Written for the highly successful Methods in Molecular Biology series, 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. Comprehensive and practical, Extracellular Vesicles: Methods and Protocols serves as an ideal guide for researchers seeking to expand our knowledge of EV functions and applications. Craniofacial Development Methods and Protocols Humana This volume explores scientific methodologies currently employed to integrate observational developmental biology, tissue explant and cell-based approaches and genetic/molecular technologies to develop a holistic understanding of craniofacial development. Chapters guide readers through the use of disparate models to study formation of the head and face (c. elegans, zebrafish, mouse, alongside human imaging approaches), together with cell culture, tissue explant and in vivo cell imaging and analysis techniques. At the molecular level, chapters include analysing gene expression using in-situ hybridisation and single-cell RNA-Sequencing (scRNA-SEQ), as well as genetic modification techniques such as CRISPR/Cas9-mediated deletion. Written in the format of the highly successful Methods in Molecular Biology series, each chapter includes an introduction to the topic, lists necessary materials and reagents, includes tips on troubleshooting and known pitfalls, and step-by-step, readily reproducible protocols. Authoritative and cutting-edge, Craniofacial Development: Methods and Protocols aims to be a guide in the field of craniofacial development for senior and new researchers looking to expand their existing research programs to encompass novel techniques. Hormone Assays in Biological Fluids Springer Science & Business Media Expert researchers who have developed and applied significant new assays describe in step-by-step detail a variety of methods for measuring a broad variety of hormones, related peptides, and synthetic steroids in various biological fluids. The hormones measured range from glucocorticoids in biological fluids, urinary steroids, aldosterone in blood, and plasma renin activity, to gut hormones in plasma, melatonin, prolactin, 6-sulfatoxymelatonin, and androgens in blood, saliva, and hair. The emphasis is on noncommercial assays so that investigators can set up novel methods suited to their special needs. Commercial assays are also described for comparative purposes. Tutorials on radioimmunoassay, gas chromatography-mass spectrometry, high-performance liquid chromatography, and PCR techniques help the reader to choose the best method for his or her purpose. Nanoscale Imaging Methods and Protocols Humana This volume presents readers with the latest techniques to study nanoimaging and nanoprobing in application to a broad range of biological systems. The chapters in this book are divided into five parts, and cover topics such as imaging and probing of biomacromolecules including high-speed imaging and probing with AFM; probing chromatin structure with magnetic tweezers; and fluorescence correlation spectroscopy on genomic DNA in living cells. 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 through, Nanoscale Imaging: Methods and Protocols is a valuable resource for anyone interested in learning more about this developing and expanding field.