

Nikon Ti Inverted Microscope Manual

Cytokinesis, the latest volume in the Methods in Cell Biology series, looks at the latest advances in cytokinesis. Edited by leaders in the field, this volume presents proven, state-of-art techniques, along with relevant historical background and theory, to aid researchers in efficient design and effective implementation of experimental methodologies. Covers sections on cytokinesis and emerging studies Presents chapters written by experts in the field Includes cutting-edge materials that supplement study Loss of muscle mass and increased fibrosis characterize both sarcopenia of aging and muscular dystrophy. Research is increasingly showing that these two conditions also share several pathophysiological mechanisms, including mitochondrial dysfunction, increased apoptosis, abnormal modulation of autophagy, decline in satellite cells, increased generation of reactive oxygen species, and abnormal regulation of signaling and stress response pathways. This Research Topic will cover several mechanisms involved in aging and dystrophic sarcopenia and explore the therapeutic potential of various strategies for intervention.

Viruses in the Parvoviridae family constitute one of the most diverse and intriguing fields of research. While they all share an ssDNA genome and a small capsid, they can differ widely in structure, genome organization and expression, virus–cell interaction, and impact on the host. Exploring such diversity and unraveling the inherent complexity in these apparently simple viruses is an ongoing endeavor and commitment for the scientific community. The translational implications of research on parvoviruses are relevant. Within the family, some viruses are important human and veterinary pathogens, in need of diagnostic methods and antiviral strategies; other viruses have long been studied and engineered as tools for oncolytic therapy, or as sophisticated gene delivery vectors, and can now display their wide and expanding applicative potential. This Special Issue of Viruses collects recent contributions in the field of parvovirus research, with a focus on new insights and research on unresolved issues, as well as new approaches exploiting systemic methodologies. Evolution, structural biology, viral replication, virus–host interaction, pathogenesis and immunity, and viral oncotherapy are a selection of the topics addressed in the issue that can be of relevance to the community involved in parvovirus research and of interest to a wider audience.

Throughout their life, plants interact with all sorts of microbes. Some of these are detrimental and cause disease; some interactions are mutually beneficial for both partners. It is clear that most, if not all, of the interactions are regulated by highly complex checks and balances sustained by signalling and exchange of messengers and nutrients. The interactions where both partners are alive for a significant part of their time together are called biotrophic. In this e-book we bring together 33 articles representing the current state-of-the-art in research about diverse biotrophic plant-microbe associations aimed at describing and understanding how these complex and ubiquitous partnerships work and ultimately support much of the land-based biosphere. The next healthcare revolution will apply regenerative medicines using human cells and tissues. The aim of the regenerative medicine approach is to create biological therapies or substitutes in vitro for the replacement or restoration of tissue function in

vivo lost through failure or disease. However, whilst science has revealed the potential, and early products have shown the power of such therapies, there is an immediate and long-term need for expertise with the necessary skills to face the engineering and life science challenges before the predicted benefits in human healthcare can be realized. Specifically, there is a need for the development of bioprocess technology for the successful transfer of laboratory-based practice of stem cell and tissue culture to the clinic as therapeutics through the application of engineering principles and practices. This Special Issue of Bioengineering on Stem Cell Bioprocessing and Manufacturing addresses the central role in defining the engineering sciences of cell-based therapies, by bringing together contributions from worldwide experts on stem cell biology and engineering, bioreactor design and bioprocess development, scale-up, and manufacturing of stem cell-based therapies.

When, in late 2011, it became public knowledge that two research groups had submitted for publication manuscripts that reported on their work on mammalian transmissibility of a lethal H5N1 avian influenza strain, the information caused an international debate about the appropriateness and communication of the researchers' work, the risks associated with the work, partial or complete censorship of scientific publications, and dual-use research of concern in general. Recognizing that the H5N1 research is only the most recent scientific activity subject to widespread attention due to safety and security concerns, on May 1, 2012, the National Research Council's Committee on Science, Technology and Law, in conjunction with the Board on Life Sciences and the Institute of Medicine's Forum on Microbial Threats, convened a one-day public workshop for the purposes of 1) discussing the H5N1 controversy; 2) considering responses by the National Institute of Allergy and Infectious Diseases (NIAID), which had funded this research, the World Health Organization, the U.S. National Science Advisory Board for Biosecurity (NSABB), scientific publishers, and members of the international research community; and 3) providing a forum wherein the concerns and interests of the broader community of stakeholders, including policy makers, biosafety and biosecurity experts, non-governmental organizations, international organizations, and the general public might be articulated. Perspectives on Research with H5N1 Avian Influenza: Scientific Enquiry, Communication, Controversy summarizes the proceedings of the workshop.

The 1st volume of our Research Topic "The Bacterial Cell: Coupling between Growth, Nucleoid Replication, Cell Division and Shape" was published as an eBook in May 2016 (see: <http://journal.frontiersin.org/researchtopic/2905/the-bacterial-cell-coupling-between-growth-nucleoid-replication-cell-division-and-shape>). As a sign of growing interest to the topic, two workshops followed the same year: "Stochasticity in the Cell Cycle" in Jerusalem (Israel) by the Hebrew University's Institute of Advanced Studies and EMBO's "Cell Size Regulation" in Joachimsthal (Germany). From the time of launching the first edition, several new groups have entered the field, and many established groups have made significant advances using state-of-the-art microscopy and microfluidics. Combining these approaches with the techniques pioneered by quantitative microbiologists decades ago, these approaches have provided remarkable amounts of numerical data. Most of these data needed yet to be put into a broader theoretical perspective. Moreover, the molecular mechanisms governing coordination and progression of the main bacterial cell cycle processes have remained largely unknown. These outstanding fundamental questions and the growing interest to the field

motivated us to launch the next volume titled “The Bacterial Cell: Coupling between Growth, Nucleoid Replication, Cell Division, and Shape, Volume 2” shortly after completion of the first edition in October 2016. The issue contains 17 contributions from a diverse array of scientists whose field of study spans microbiology, biochemistry, genetics, experimental and theoretical biophysics. The specific questions addressed in the issue include: What triggers initiation of chromosome replication? How is cell division coordinated with replication both spatially and temporally? How is cell size controlled and linked to the rate of mass growth? What role plays physical organization of the chromosomes in their segregation and in regulation of cell division? The publications covering these questions are divided into three topical areas: 1) Cell Cycle Regulation, 2) Growth and Division, and 3) Nucleoid Structure and Replication. New ideas and techniques put forward in these articles bring us closer to understand these fundamental cellular processes, but the quest to resolve them is far from being complete. Plans for the next edition are under way along with further meetings and workshops, e.g., an EMBO Workshop on Bacterial cell biophysics: DNA replication, growth, division, size and shape in Ein Gedi (Israel), May 2020. We hope that via such interdisciplinary exchange of ideas we will come closer to answering the above-mentioned complex and multifaceted questions.

Cyclic nucleotides control a number of neuronal properties including neuronal differentiation, pathfinding, regulation of excitability and synaptic transmission, and control of gene expression. Signaling events mediated by cAMP or cGMP are transient and take place within the complex 3-dimensional structure of the neuronal cell. Signaling events happen on the time scale of seconds to minutes and the biological significance of the temporal dimension remains poorly understood. Structural features of neurons (dendritic spines and branches, cell body, nucleus, axon...) as well as AKAPs and other scaffolding proteins that keep signaling enzymes together and form "signaling microdomains", are critical spatial determinants of signal integration. Finally, the types of enzymes involved in signal integration, which are expressed as a number of different types and splice variants, yield another dimension that determines signal integration properties. Biosensor imaging provides direct temporal and spatial measurement of intracellular signals. This novel approach, together with more conventional methods such as biochemistry, electrophysiology, and modeling, now provide a better understanding of the spatial and temporal features of cyclic nucleotide signal integration in living neurons. This topic aims at providing a better understanding of how neurons are "making sense" of cyclic nucleotide signaling in living neurons.

In 1996, and with extraordinary prescience, Panfilov and Holden had highlighted in their seminal book 'Computational Biology of the Heart' that biology was, potentially, the most mathematical of all sciences. Fast-forward 20 years and we have seen an explosion of applications of mathematics in not only biology, but healthcare that has already produced significant breakthroughs not imaginable more than 20 years ago. Great strides have been made in explaining through quantitative methods the underlying mechanisms of human disease, not without considerable ingenuity and effort. Biological mechanisms are bewildering: complex, ever evolving, multi-scale, variable, difficult to fully access and understand. This poses immense challenges to the computational physiology community that, nevertheless, has developed an impressive arsenal of tools and methods in a vertiginous race to

combat disease with the tall order of improving human healthcare. Mechanistic models are now contending with the advent of machine learning in healthcare and the hope is that both approaches will be used synergistically since the complexity of human pathophysiology and the difficulty of acquiring human datasets will require both, deductive and inductive methods. This Research Topic presents work that is currently at the frontier in computational physiology with a striking range of applications, from diabetes to graft failure and using a multitude of mathematical tools. This collection of articles represents a snapshot in a field that is moving a dizzying speed, bringing understanding of fundamental mechanism and solutions to healthcare problems experienced by healthcare systems all over the world.

Microtubules: in vivo includes chapters by experts around the world on many aspects of microtubule imaging in living and fixed cells; assays to study microtubule function in a wide array of model organisms and cultured cells; high resolution approaches to study of the cytoskeleton. The authors share their years of experience, outlining potential pitfalls and critical factors to consider in experimental design, experimental implementation and data interpretation. Includes chapters by experts around the world on many aspects of microtubule imaging in living and fixed cells; assays to study microtubule function in a wide array of model organisms and cultured cells; high resolution approaches to study of the cytoskeleton The authors share their years of experience, outlining potential pitfalls and critical factors to consider in experimental design, experimental implementation and data interpretation This book is a complete guide to setting up an IVF laboratory. Beginning with an introduction to the history and the basics, the following chapters take clinicians through the full set up and management process, from air quality control and cryopreservation facilities, to morphological embryo assessment, sperm processing and selection techniques, to document management systems. A separate chapter provides an update on semen analysis based on World Health Organisation (WHO) standards and interpretation of results. Written by an extensive author and editor team from the UK, Europe and the USA, this practical manual is invaluable for embryologists and IVF specialists planning to set up and manage an IVF laboratory successfully. Key points Practical guide to setting up and managing an IVF laboratory Provides step by step process Includes chapter on semen analysis based on WHO standards and interpretation of results Extensive author and editor team from UK, Europe and USA

This volume presents the Proceedings of the 6th European Conference of the International Federation for Medical and Biological Engineering (MBEC2014), held in Dubrovnik September 7 – 11, 2014. The general theme of MBEC 2014 is "Towards new horizons in biomedical engineering" The scientific discussions in these conference proceedings include the following themes: - Biomedical Signal Processing - Biomedical Imaging and Image Processing - Biosensors and Bioinstrumentation - Bio-Micro/Nano Technologies - Biomaterials - Biomechanics, Robotics and Minimally Invasive Surgery - Cardiovascular, Respiratory and Endocrine Systems Engineering - Neural and Rehabilitation Engineering - Molecular, Cellular and Tissue Engineering - Bioinformatics and Computational Biology - Clinical Engineering and Health Technology Assessment - Health Informatics, E-Health and Telemedicine - Biomedical Engineering Education

The pestiviruses encompass some of the most economically important viral infections in the cattle, swine, and sheep industries

worldwide. Discovered more than 70 years ago, bovine viral diarrhea virus (BVDV) and classical swine fever virus (CSFV) were long the main concern, but many new pestiviruses have emerged in recent years, which may also present additional threats to biosecurity and food safety. This issue brings together contributions from multiple disciplines – virology, immunology, veterinary clinical medicine, epidemiology, and pathology – on the subject of BVDV and related pestiviruses, and cover host–virus interactions, virus–cell interactions, cross-species transmission as well as the role of wildlife species as reservoirs of some of the pestiviruses.

Security and authentication issues are surging to the forefront of the research realm in global society. As technology continues to evolve, individuals are finding it easier to infiltrate various forums and facilities where they can illegally obtain information and access. By implementing biometric authentications to these forums, users are able to prevent attacks on their privacy and security. *Biometrics: Concepts, Methodologies, Tools, and Applications* is a multi-volume publication highlighting critical topics related to access control, user identification, and surveillance technologies. Featuring emergent research on the issues and challenges in security and privacy, various forms of user authentication, biometric applications to image processing and computer vision, and security applications within the field, this publication is an ideal reference source for researchers, engineers, technology developers, students, and security specialists.

The Practical Manual of In Vitro Fertilization: Advanced Methods and Novel Devices is a unique, accessible title that provides a complete review of the most well-established and current diagnostic and treatment techniques comprising in vitro fertilization. Throughout the chapters, a uniform structure is employed, including a brief abstract, a keyword glossary, a step-by-step protocol of the laboratory procedures, several pages of expert commentary, key issues of clinical concern, and a list of references. The result is a readily accessible, high quality reference guide for reproductive endocrinologists, urologists, embryologists, biologists and research scientists. The Manual also offers an excellent description of novel procedures that will likely be employed in the near future. An indispensable resource for physicians and basic scientists, *The Practical Manual of In Vitro Fertilization: Advanced Methods and Novel Devices* is an invaluable reference and addition to the literature. *Manual of Intracytoplasmic Sperm Injection in Human Assisted Reproduction With Other Advanced Micromanipulation Techniques to Edit the Genetic and Cytoplasmic Content of the Oocyte* Cambridge University Press

Middle East respiratory syndrome coronavirus (MERS-CoV) is an emerging zoonotic coronavirus. First identified in 2012, MERS-CoV has caused over 2460 infections and a fatality rate of about 35% in humans. Similar to severe acute respiratory syndrome coronavirus (SARS-CoV), MERS-CoV likely originated from bats; however, different from SARS-CoV, which potentially utilized palm civets as its intermediate hosts, MERS-CoV likely transmits to humans through dromedary camels. Animal models, such as humanized mice and nonhuman primates, have been developed for studying MERS-CoV infection. Currently, there are no vaccines and therapeutics approved for the prevention and treatment of MERS-CoV infection, although a number of them have been developed preclinically or tested clinically. This book covers one editorial and 16 articles (including seven review articles and nine original research papers) written by researchers working in the field of MERS-CoV. It describes the following three main aspects: (1) MERS-CoV epidemiology, transmission, and pathogenesis; (2) current progress on MERS-CoV animal models, vaccines, and therapeutics; and (3) challenges and future prospects for MERS-CoV research.

Overall, this book will help researchers in the MERS-CoV field to further advance their work on the virus. It also has important implications for other coronaviruses as well as viruses outside the coronavirus family with pandemic potentials.

This book, as a collection of 17 research articles, provides a selection of the most recent advances in the synthesis, characterization, and applications of environmentally friendly and biodegradable biopolymer composites and nanocomposites. Recently, the demand has been growing for a clean and pollution-free environment and an evident target regarding the minimization of fossil fuel usage. Therefore, much attention has been focused on research to replace petroleum-based commodity plastics by biodegradable materials arising from biological and renewable resources. Biopolymers—polymers produced from natural sources either chemically from a biological material or biosynthesized by living organisms—are suitable alternatives for addressing these issues due to their outstanding properties, including good barrier performance, biodegradation ability, and low weight. However, they generally possess poor mechanical properties, a short fatigue life, low chemical resistance, poor long-term durability, and limited processing capability. In order to overcome these deficiencies, biopolymers can be reinforced with fillers or nanofillers (with at least one of their dimensions in the nanometer range). Bionanocomposites are advantageous for a wide range of applications, such as in medicine, pharmaceuticals, cosmetics, food packaging, agriculture, forestry, electronics, transport, construction, and many more.

The Planctomycetes, Verrucomicrobia, Chlamydiae (PVC) and related phyla have recently emerged as fascinating subjects for research in evolutionary cell biology, ecology, biotechnology, evolution and human health. This interest is prompted by particular characteristics observed in the PVC superphylum that are otherwise rarely observed in bacteria but are however still poorly described or understood, such as the presence of a complex endomembrane system, or compacted DNA throughout most of the cell cycle. Therefore, the members of the PVC superphylum represent an excellent example of the value of studying bacteria other than 'classical' models.

Every second, users produce large amounts of image data from medical and satellite imaging systems. Image mining techniques that are capable of extracting useful information from image data are becoming increasingly useful, especially in medicine and the health sciences. Biomedical Image Analysis and Mining Techniques for Improved Health Outcomes addresses major techniques regarding image processing as a tool for disease identification and diagnosis, as well as treatment recommendation. Highlighting current research intended to advance the medical field, this publication is essential for use by researchers, advanced-level students, academicians, medical professionals, and technology developers. An essential addition to the reference material available in the field of medicine, this timely publication covers a range of applied research on data mining, image processing, computational simulation, data visualization, and image retrieval.

This book is a printed edition of the Special Issue "Novel Biomaterials for Tissue Engineering 2018" that was published in IJMS

This volume is the first of 3 parts looking at current methodology for the imaging and spectroscopic analysis of live cells. The chapters provide hints and tricks not available in primary research publications. It is a useful resource for academics, researchers and students alike.

This volume presents the proceedings of the joint conference of the European Medical and Biological Engineering Conference (EMBEC) and the Nordic-Baltic Conference on Biomedical Engineering and Medical Physics (NBC), held in Tampere, Finland, in June 2017. The proceedings present all traditional biomedical engineering areas, but also highlight new emerging fields, such as tissue engineering, bioinformatics, biosensing, neurotechnology, additive manufacturing technologies for medicine and biology,

and bioimaging, to name a few. Moreover, it emphasizes the role of education, translational research, and commercialization. This book is a printed edition of the Special Issue "Passive Micromixers" that was published in *Micromachines*. Beauty masks, diapers, wound dressings, wipes, protective clothes and biomedical products: all these high-value and/or large-volume products must be highly compatible with human skin and they should have specific functional properties, such as anti-microbial, anti-inflammatory and anti-oxidant properties. They are currently partially or totally produced using fossil-based sources, with evident issues linked to their end of life, as their waste generates an increasing environmental concern. On the contrary, biopolymers and active biomolecules from biobased sources could be used to produce new materials that are highly compatible with the skin and also biodegradable. The final products can be obtained by exploiting safe and smart nanotechnologies such as the extrusion of bionanocomposites and electrospinning/electrospray, as well as innovative surface modification and control methodologies. For all these reasons, recently, many researchers, such as those involved in the European POLYBIOSKIN project activities, have been working in the field of biomaterials with anti-microbial, anti-inflammatory and anti-oxidant properties, as well as biobased materials which are renewable and biodegradable. The present book gathered research and review papers dedicated to materials and technologies for high-performance products where the attention paid to health and environmental impact is efficiently integrated, considering both the skin-compatibility of the selected materials and their source/end of life.

For around half of the couples who have trouble conceiving the cause of infertility is sperm-related. Intracytoplasmic sperm injection (ICSI) is the most common and successful treatment for male infertility. Here, the pioneers for the technique, along with authorities in the field, describe the underlying science of ICSI and other micromanipulation techniques. Practical advice for performing the techniques is covered in depth, including sperm selection, laser-assisted ICSI, and the use of piezo in ICSI. Examining the safety of ICSI in animal models as well as the impact of ICSI on the health and well-being of the children conceived through the procedure is discussed. This manual is an essential resource for clinical embryologists and laboratory personnel wishing to refine or develop techniques and improve outcomes.

This volume contains a unique selection of chapters covering a wealth of contemporary topics in this ubiquitous and diverse system of cell signaling. It offers much more than the accessibility and authority of a primary text book, exploring topics ranging from the fundamental aspects of calcium signaling to its varied clinical implications. It presents comprehensive discussion of cutting-edge research alongside detailed analysis of critical issues, at the same time as setting out testable hypotheses that point the way to future scientific endeavors. The contributions feature material on theoretical and methodological topics as well as related subjects including mathematical modeling and simulations. They examine calcium signaling in a host of contexts, from mammalian cells to bacteria, fruit fly and zebrafish. With much of interest to newcomers to the field as well as seasoned experts, this new publication is both wide-ranging and authoritative. The chapter "Calcium Signaling: From Basic to Bedside" is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

This handbook describes experimental techniques to monitor and manipulate individual biomolecules, including fluorescence

detection, atomic force microscopy, and optical and magnetic trapping. It includes single-molecule studies of physical properties of biomolecules such as folding, polymer physics of protein and DNA, enzymology and biochemistry, single molecules in the membrane, and single-molecule techniques in living cells.

Die Arbeit beschreibt ein Verfahren zu Hochdurchsatz-Mikroskopie, mit dem großflächige Objekte wie Mikrotiterplatten deutlich schneller als mit herkömmlichen Verfahren gescannt werden können ohne Einbußen der Bildqualität. Dazu wird das Objekt während einer kontinuierlichen Bewegung digitalisiert, wobei Bewegungsunschärfe durch eine Blitzbeleuchtung vermieden wird. Dank eines neuartigen Hardware-Autofokussystems bleibt das Objekt während des Scans zudem stets im Fokus.

Chemical Tools for Imaging, Manipulating, and Tracking Biological Systems: Diverse Chemical, Optical and Bioorthogonal Methods, Volume 641 in the Methods in Enzymology series, continues the legacy of this premier serial with quality chapters authored by leaders in the field. Chapters in this new release include caged cyclopropanes with improved tetrazine ligation kinetics, an analysis of metabolically labeled inositol phosphate messengers by NMR, cell-permeant caged inositol pyrophosphates for probing β -cells, imaging phospholipase D activity with clickable alcohols via transphosphatidylation, fluorescent biorthogonal labeling of class B GPCRs in live cells, near-infrared photoactivatable nitric oxide donors with integrated photoacoustic monitoring, and much more. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Methods in Enzymology series Includes the latest information on retinoid signaling pathways

There is growing interest in the use of physical plasmas (ionized gases) for biomedical applications, especially in the framework of so-called “plasma medicine”, which exploits the action of low-power, atmospheric pressure plasmas for therapeutic purposes. Such plasmas are “cold plasmas”, in the sense that only electrons have a high temperature, whereas ions and the neutral gas particles are at or near room temperature. As a consequence, the “plasma flame” can be directly applied to living matter without appreciable thermal load. Reactive chemical species, charged particles, visible and UV radiation, and electric fields are interaction channels of the plasma with pathogens, cells, and tissues, which can trigger a variety of different responses. Possible applications include disinfection, wound healing, cancer treatment, non-thermal blood coagulation, just to mention some. The understanding of the mechanisms of plasma action on living matter requires a strongly interdisciplinary approach, with competencies ranging from plasma physics and technology to chemistry, to biology and finally to medicine. This book is a collection of work that explores recent advances in this field.

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