Extracellular Vesicles In Health And Disease | 201b864aea11a51215623fc0ef2d38ab


According to the World Health Organization, the epidemic of global obesity has nearly tripled since 1975. In 2016, more than 1.9 billion adults were overweight, over 650 million of which were obese. Being overweight and obese has been linked to a number of non-communicable, chronic diseases. Pathophysiology of Obesity-Induced Health Complications is a compilation of review articles dedicated to describe comorbidities associated with obesity. The wide range that is covered is of significant interest to basic research scientists, clinicians and graduate students who are engaged in studying obesity-induced health complications. Furthermore, this book highlights the potential of novel approaches for the prevention and treatment of obesity and its related illnesses. Nineteen articles in this book are organized in four sections that are designed to provide an overview of obesity-induced health complications. The first section serves as an introductory section on the prevalence, causes, consequences, treatments and preventive approaches for obesity. Section two covers the metabolic disturbances and inflammation due to obesity. The third section is focused on neurological and visceral complications as a consequence of obesity. The final section covers strategies for the prevention of obesity-induced complications. The book illustrates that obesity can result in a diverse range of pathophysiological conditions that adversely affect health.

A flurry of recent research on the role of the RNA/DNA-binding proteins TDP-43 and FUS as well as a dozen other factors (e.g., C9ORF72 and profilin) has led to a new paradigm in our understanding of the pathobiology of the motor neuron disease, Amyotrophic Lateral Sclerosis (ALS). How these factors trigger neuromuscular dysfunction is critical for developing more effective ALS therapeutics. The ‘gain-of-toxicity’ or ‘loss-of-function’ of these etiological factors is a key question. Recent studies on the imbalance in genome damage versus repair have opened avenues for potential DNA repair-based therapeutics. This book highlights emerging science in the area of ALS and discusses key approaches
and mechanisms essential for developing a cure for ALS.

This book, Telomerase and non-Telomerase Mechanisms of Telomere Maintenance, is a collection of reviewed and relevant research chapters, offering a comprehensive overview of recent developments in the field of biochemistry, genetics, and molecular biology. The book comprises single chapters authored by various researchers and edited by an expert active in the molecular biology research area. All chapters are individually complete but united under a common research topic. This publication aims to provide a thorough overview of the latest research efforts by international authors on biochemistry, genetics, and molecular biology, and open new possible research paths for further novel developments. A note from the publisher: It is with great sadness and regret that we inform the contributing authors and readers of this book that the Editor, Dr Tammy A. Morrish, passed away during the publishing process of the book and before having a chance to see its publication. The book Telomerase and non-Telomerase Mechanisms of Telomere Maintenance was her first edited volume with us. Fruitful collaboration continued until her final days. We would like to acknowledge Dr Morrish's contribution to scientific publishing, which she made during years of dedicated work, and express our gratitude for her pleasant cooperation with us.

Mesenchymal stem cell-derived exosomes are at the forefront of research in two of the most high profile and funded scientific areas – cardiovascular research and stem cells. Mesenchymal Stem Cell Derived Exosomes provides insight into the biofunction and molecular mechanisms, practical tools for research, and a look toward the clinical applications of this exciting phenomenon which is emerging as an effective diagnostic. Primarily focused on the cardiovascular applications where there have been the greatest advancements toward the clinic, this is the first compendium for clinical and biomedical researchers who are interested in integrating MSC-derived exosomes as a diagnostic and therapeutic tool. Introduces the MSC-exosome mediated cell-cell communication Covers the major functional benefits in current MSC-derived exosome studies Discusses strategies for the use of MSC-derived exosomes in cardiovascular therapies

Extracellular Vesicles, Volume 645 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 Genetic labeling of extracellular vesicle exosomes for studying biogenesis and uptake in living mammalian cells, Fluorescent Labeling of Extracellular Vesicles, Isolation of extracellular vesicles from lymph, Transgenic rats for tracking body fluid/tissue-derived extracellular vesicles, Isolation of amniotic extracellular vesicles, Urinary extracellular vesicle isolation, Immunocapture-based ELISA to Characterize and Quantify Extracellular Vesicles in Both Cell Culture Supernatants and Body Fluids, 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

Extracellular vesicle is a wide term that involves many different types of vesicles. Almost all the cell types studied secrete vesicles to the extracellular environment related to cell-cell communication. Extracellular vesicles have been found in different biological fluids, such as blood, milk, saliva, tears, urine, and cerebrospinal fluid. These vesicles transport different molecules, including mRNA, proteins, and lipids, some of them cell type specific that make them ideal biomarkers in both health and disease conditions. However, their contribution to different conditions is not well understood. The aim of this book is to provide an overview of the extracellular vesicles in the human body, how they are internalized, and their participation in several diseases.

Get a quick, expert overview of the ways in which biomarkers can be used to assess and guide the management of cardiovascular disease in
Interest in the role of extracellular vesicles (microvesicles and exosomes) is expanding rapidly. It is now apparent that far from being merely cellular debris, these vesicles play a key role in cell-to-cell communication and signaling. Moreover, they are significantly elevated in a number of diseases. This raises the question of their direct role in pathogenesis as well as their possible use as biomarkers. This book stems from the first international meeting on "Microvesicles and Nanovesicles in Health and Disease" held at Magdalen College, Oxford, in 2010. The purpose of the meeting was to bring together, for the first time, a range of experts from around the world to discuss the latest advances in this field. Key to the study of these vesicles is the availability of methodologies for their measurement in biological fluids. A major section of the meeting focused on a range of exciting new technologies which have been developed for this purpose. The presentations at this meeting form the basis of this book, which will appeal to basic scientists, clinicians, and those developing technology for the measurement of extracellular vesicles.

This comprehensive encyclopedic reference provides rapid access to focused information on topics of cancer research for clinicians, research scientists and advanced students. Given the overwhelming success of the first edition, which appeared in 2001, and fast development in the different fields of cancer research, it has been decided to publish a second fully revised and expanded edition. With an A-Z format of over 7,000 entries, more than 1,000 contributing authors provide a complete reference to cancer. The merging of different basic and clinical scientific disciplines towards the common goal of fighting cancer makes such a comprehensive reference source all the more timely.

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.

This book reviews the role of exosomes and extracellular vesicles in both normal and pathological conditions. It first explains isolation methods for exosomes, and analyzes their fine structure and biological functions. Further, it highlights exosomes’ role as the key regulator in embryonic-maternal communication, and in the pathogenesis of various diseases, including cancer and urogenital, infectious, and neurodegenerative...
diseases. Moreover, it reviews the latest advances in using stem-cell-derived exosomes as a cell-free strategy in regenerative medicine, as well as the potential of exosomal microRNA as a promising non-invasive biomarker and targetable factor in cancer diagnosis and treatment. Lastly, it explores the use of natural and synthetic exosomes as nano-vehicles for efficient drug delivery.

This book offers comprehensive information on all aspects of ELISA, starting with the fundamentals of the immune system. It also reviews the history of analytical assays prior to the advent of ELISA (enzyme-linked immunosorbent assay) and addresses the materials of choice for the fabrication of the platforms, possible biomolecular interactions, different protocols, and evaluation parameters. The book guides readers through the respective steps of the analytical assay, while also familiarizing them with the possible sources of error in the assay. It offers detailed insights into the immobilization techniques used for protein attachment, as well as methods for evaluating the assay and calculating the key parameters, such as sensitivity, specificity, accuracy and limit of detection. In addition, the book explores the advantages and shortcomings of the conventional ELISA, as well as various approaches to improving its performance. In this regard, merging and integrating other technologies with widely known ELISAs have opened new avenues for the advancement of this immunoassay. Accordingly, the book provides cutting-edge information on integrated platforms such as ELISpot, plasmonic ELISAs, sphere-/bead-based ELISAs, paper-/fiber-based ELISAs and ELISA in micro-devices.

This thoroughly revised and updated edition of a widely used practical guide to flow cytometry describes in step-by-step detail an array of time proven and cutting-edge techniques much needed in today's advanced laboratories. These readily reproducible methods deploy emerging flow cytometry technologies in many new applications, especially in the field of stem cells, functional genomics and proteomics, and microbiology. Here, the aspiring investigator will find methods for the characterization of stem/progenitor cells by monitoring the efflux of fluorescent dyes and the elucidation of signal transduction pathways using phospho-specific antibodies. There are also techniques for monitoring gene transfer and expression using fluorescent protein technology, high throughput screening for discovery of novel protein interactions, phenotypic and functional characterization of T cell subsets and precursors, and microbial flow cytometry, to highlight but some of the many useful procedures.

The first major text to link the discoveries of basic biology to the understanding and clinical management of liver diseases, The Liver: Biology and Pathobiology has long been a classic in gastroenterology and hepatology. Now, this landmark work has been thoroughly revised and updated to reflect recent groundbreaking achievements in the laboratory and clinic. More than 100 world-renowned investigators provide a definitive account of current concepts on the structure and function of the liver and the mechanisms underlying liver diseases. This edition has been pared down to a smaller, more user-friendly size and focused more sharply on the most important advances. A Brandon-Hill recommended title.

Extracellular vesicles are small vesicles (or membrane-bound organelles) that can be found in blood and other biofluids and their internal content and surface reflect their origin and potential function. Extracellular Vesicles: Mechanisms and Role in Health and Disease begins with a summary of the most recent findings about the potential role of extracellular vesicles in human health and diseases and discusses future directions. The authors discuss how intercellular communication at the developing feto-maternal interface is of cardinal interest. The implantation itself is at least partially-dependent on extracellular vesicles' mediated processes. Furthermore, the altered local and systemic immunomodulatory state seems to be significantly influenced by proteomic and nucleic acid cargo found in extracellular vesicles. Lastly, recent studies in the development of metastatic potential are studied by focusing on the role of oxidative stress under the control of...
reprogrammed onco-metabolism using the LNCaP-C4-2B prostate cancer progression model system.

Exosomes: A Clinical Compendium is a comprehensive and authoritative account of exosomes in the context of biomarkers, diagnostics, and therapeutics across a wide spectrum of medical disciplines, as well as their role in cell-cell communication. It is intended to serve as a reference source for clinicians, physicians, and research scientists who wish to gain insight into the most recent advances in this rapidly growing field. The exosome revolution may well be the greatest advance in physiology and medicine since antibiotics. The discovery of their epigenetic role in intercellular signaling in virtually all tissues is a major breakthrough in our understanding of how cells function. Provides readers with a broad and timely overview of exosomes in health and disease, closing with a thought-provoking chapter on transgenerational inheritance, Darwin and Lamarck. Summarizes the most recent laboratory and clinical findings on exosomes across numerous medical disciplines, thereby offering readers a broad-ranging and solid foundation for prospective investigative efforts Twenty-one chapters authored by a global team of peer-acknowledged experts, each representing a key medical disciplineProvides readers with a broad and timely overview of exosomes in health and disease, closing

The book provides an intensive overview on exosomes in cardiovascular diseases, its potential as biomarkers, as well as pathological and therapeutic effects. It firstly describes the general aspects of exosomes including the definition, formation and secretion of exosomes and highlight their roles as biomarkers and pathological and therapeutic effects in cardiovascular diseases as well. Secondly, basic aspects of exosomes including the purification methods of exosomes, exosomes content, and functional roles of the cardiovascular exosomes are summarized. Thirdly, exosomes as biomarkers of cardiovascular diseases are overviewed including their roles in diagnosis, prognosis and reaction to therapy. Fourthly, pathological effects of exosomes and therapeutic effects of exosomes are highlighted. Finally, future prospects of exosomes in cardiovascular research would be provided. This is an essential reference for researchers working in cell biology and regeneration, as well as clinicians such as cardiologist.

Extracellular and biofluids vesicles (EVs) are highly specialised yet ubiquitous nanoscale messengers secreted by cells. With the development of stem cell engineering, EVs promise to deliver next generation tools in regenerative medicine and tissue engineering, as well as in diagnostics. A vibrant and promising field, this book provides the first resource to the field. Covering basic cell biology, including EV production and intracellular communication, this book will provide material scientists and engineers with a foundation to the necessary biology. The reader will then learn about the isolation of extracellular vesicles their physicochemical characterisation and therapeutic application of EVs in regenerative medicine as well as their potential as biomarkers in medical diagnostic. This book will also discuss the regulatory landscape of EVs. Bridging cell biology, biomaterials, biophysics and biomedical engineering the content of this book is written with a broad interdisciplinary audience in mind. Researchers, new and established will find this a must-have on their shelf.

Drug Targeting and Stimuli Sensitive Drug Delivery Systems covers recent advances in the area of stimuli sensitive drug delivery systems, providing an up-to-date overview of the physical, chemical, biological and multistimuli-responsive nanosystems. In addition, the book presents an analysis of clinical status for different types of nanoplatforms. Written by an internationally diverse group of researchers, it is an important reference resource for both biomaterials scientists and those working in the pharmaceutical industry who are looking to help create more effective drug delivery systems. Shows how the use of nanomaterials can help target a drug to specific tissues and cells Explores the development of stimuli-responsive drug delivery systems Includes case studies to showcase how stimuli responsive nanosystems are used in a variety of therapies, including camptothecin delivery, diabetes and cancer therapy
**PLATELETS** is the definitive current source of state-of-the-art knowledge about platelets and covers the entire field of platelet biology, pathophysiology, and clinical medicine. Recently there has been a rapid expansion of knowledge in both basic biology and the clinical approach to platelet-related diseases including thrombosis and hemorrhage. Novel platelet function tests, drugs, blood bank storage methods, and gene therapies have been incorporated into patient care or are in development. This book draws all this information into a single, comprehensive and authoritative resource.

- First edition won Best Book in Medical Science Award from the Association of American Publishers
- Contains fourteen new chapters on topics such as platelet genomics and proteomics, inhibition of platelet function by the endothelium, clinical tests of platelet function, real time in vivo imaging of platelets, and inherited thrombocytopenias
- A comprehensive full color reference comprising over 70 chapters, 1400 pages, and 16,000 references

Bridging the gap between basic scientific advances and the understanding of liver disease — the extensively revised new edition of the premier text in the field. The latest edition of *The Liver: Biology and Pathobiology* remains a definitive volume in the field of hepatology, relating advances in biomedical sciences and engineering to understanding of liver structure, function, and disease pathology and treatment. Contributions from leading researchers examine the cell biology of the liver, the pathobiology of liver disease, the liver’s growth, regeneration, metabolic functions, and more. Now in its sixth edition, this classic text has been exhaustively revised to reflect new discoveries in biology and their influence on diagnosing, managing, and preventing liver disease. Seventy new chapters — including substantial original sections on liver cancer and groundbreaking advances that will have significant impact on hepatology — provide comprehensive, fully up-to-date coverage of both the current state and future direction of hepatology. Topics include liver RNA structure and function, gene editing, single-cell and single-molecule genomic analyses, the molecular biology of hepatitis, drug interactions and engineered drug design, and liver disease mechanisms and therapies. Edited by globally-recognized experts in the field, this authoritative volume: Relates molecular physiology to understanding disease pathology and treatment Links the science and pathology of the liver to practical clinical applications Features 16 new “Horizons” chapters that explore new and emerging science and technology Includes plentiful full-color illustrations and figures

This volume of *Current Topics in Membranes* focuses on Membrane Fusion, beginning with fusion and fission of lipid bilayers, with reviews focused on hemifusion and dynamic remodeling of membranes catalyzed by dynamin. Other topics discussed include viral fusion, intracellular fusion, developmental cell fusion, and theoretical modeling.

**Diagnostic and Therapeutic Applications of Exosomes in Cancer** evaluates the potential of exosome content manipulation in the development of novel therapeutics. In recent years, exosomes, the small vesicles produced by all cell types, have been identified as contributors to cancer growth and metastasis. However, due to their unique biophysical properties, they are also being tested for use in therapeutic design and delivery, as well as in diagnostics. This book presents a comprehensive analysis on exosomes, with a main emphasis on their biogenesis and signaling, use as biomarkers, and as tools for imaging, drug delivery and the treatment of cancer. Covers emerging pharmaceutical and diagnostic applications, including exosomes being tested as carriers of anticancer drugs, ongoing clinical trials, and exosomes as imaging agents for cancer diagnosis and treatment Brings together a team of highly regarded international authors who provide a full-rounded analysis

The aim of this book is to provide an overview of the importance of exosomes in the biomedical field, which involves in novel implications of
Exosomes are small (30-100 nm diameter) membrane enclosed vesicles of endosomal origin, released by a variety of cell types, which are capable of transferring biologically active macromolecules, such as proteins, lipids and RNA to other cells. Therefore, exosomes are important mediators of intercellular communication influencing physiological or pathological processes at recipient cells. In this book, Chapter One briefly reviews the knowledge gained on the molecular mechanisms underlying exosome formation and release. Chapter Two studies whether the Extracellular Vesicle (EV) Array can be utilized to phenotype unpurified small EVs (sEVs) from other body fluids such as urine, saliva, synovial fluid, cerebrospinal fluid (CSF), ascites, bone marrow (BM) and bronchoalveolar lavage fluid (BALF). Chapter Three examines the multifaceted roles of tumor-associated exosomes in the development and progression of cancer as well as the unique utility they present to detect, monitor, and therapeutically combat tumor occurrences. Chapter Four provides a review of the types of EVs encountered by sperm in the environment they traverse on their journey to the ampulla in the oviduct.

Originally viewed as 'garbage bags' which cells release to dispose of unwanted material, extracellular vesicles (EVs) have emerged as potent messengers that package and disseminate biochemical signals. This newly recognized mode of communication between cells has brought unprecedented therapeutic opportunities; at least 8 clinical trials and 7 companies are investigating or developing EVs as therapeutic products. As the EV industry rapidly grows, there is a rising demand for strategies that facilitate EV manufacturing. In this thesis, we address several challenges in EV manufacturing. By quantifying how many EVs a cell can release before it divides, we discovered that EV output increases as cells divide more slowly, providing a new way to maximize EV output from cells. Using our mathematical description of EV output, we built a computational model to estimate costs of EV manufacturing. Selecting cells with higher EV output despite slower proliferation can drastically lower costs. Meanwhile, although ultracentrifugation is the current standard for purifying EVs, we found that ultrafiltration-
specifically tangential-flow filtration is a more economical and scalable alternative, and we experimentally determined its utility for scaling up EV purification. For quality control, we established a suite of potency assays to measure the overall inflammatory action of EVs derived from human stem cells. Significant variability in EV potency between cells of different donors was detected, substantiating the need to robustly screen for appropriate cell sources when manufacturing EVs. Towards controlling EV function, we genetically constructed a versatile, multi-domain ligand that localizes to and modifies the surface of vesicles. Integrating biological, processing, and economic aspects of EV manufacturing, this thesis recommends strategies that may accelerate commercialization and clinical translation of EV therapy.

Nucleic Acid Nanotheranostics: Biomedical Applications offers a comprehensive overview of improvements and new trends in fabrication of nanostructures as theranostic multifunctional carriers in gene therapy. With a strong focus on medical applications (comprising diagnosis, therapy and imaging), the book also examines gene therapy in an individual patient’s cells or tissues to treat genetic diseases. Sections cover Biomedical and Diagnostic applications of Nucleic Acids, Biologic and Synthetic Advanced Nanostructures for nucleic acid delivery, and important considerations of nanomedicine. This book is a valuable guide for materials scientists, physicians, chemists and engineers, but is also ideal for clinicians wishing to expand their knowledge. Provides a unique source of knowledge (theoretical as well as practical) on nanotheranostic materials for gene therapy at all levels and related scientific areas Covers the pros and cons related to viral and nanomaterial-based delivery of nucleic acids in terms of biosafety, carrier selection, synthesis and bioimaging Presents the only book to include an analysis of nanoformulations approved for clinical use

Obesity is a serious medical problem that affects millions of people, especially in Western societies. Although long considered a complicating factor in a variety of diseases, there is now widespread agreement that obesity itself should be classified and treated as a disease and that it has important consequences for personal health, quality of life and cost to society. Understanding obesity and the means of treating it have been hampered in the past. There have been misperceptions that obesity is a behavioral disorder and that its treatments provides only cosmetic benefits. Pharmacologic approaches to treatment have suffered from problems of limited efficacy, reduced activity upon chronic use, and serious side effects, including abuse liability, cardiac disease, hypertension, and respiratory complications. Finally, there has been a proliferation of consumer and natural products with unproven benefits. This book attempts to address both the problems associated with obesity and the approaches to treating it. In the first section devoted to pathology, Drs. DIGIROLAMO, HARP, and STEVENS elaborate in Chap. 1 on how obesity and its medical complications develop. As described by Dr. PI-SUNYER in Chap. 2, obesity is a disease seen most often in affluent Western societies and is associated with the aforementioned medical problems, as well as Type II diabetes mellitus and gallbladder disease. Drs. CHAGNON, PERUSSE, and BOUCHARD review the human genetics of obesity in Chap. 3, and Drs.

This second edition volume provides detailed protocols that address the challenges of signal-transduction IHC. This book delves into chapters that discuss the nature of signal transduction phenomena and approaches to making phosphor-specific antibodies, as well as numerous bona fide methods methods on digital imaging techniques, preservation of tissue targets, multicolor detection, flow cytometry, lipophagy analysis, apoptosis, and the combination of IHC with in situ hybridization. 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. Thorough and comprehensive, Signal Transduction Immunohistochemistry: Methods and Protocols, Second Edition is a valuable resource to both novices and experts in other fields of biomedical research who need advice on IHC protocols to study signal transduction. This book will also be useful for researchers in academia, government
This book is a comprehensive guide to the techniques, clinical applications, and benefits of the different forms of liquid biopsy employed in patients with a variety of tumor types, including lung, breast and colorectal cancer. Offering detailed explanations, it discusses the how changes in tumors can be tracked using these cutting-edge technologies, which enable the detection and analysis of diverse circulating biomarkers: tumor cells, tumor DNA, tumor RNA (free or in exosomes), and fluid biomarkers identifiable by means of targeted proteomics. The use of such advanced technologies is enabling us to tackle questions and problems in a way that was not possible just a few years ago. We now have at our disposal an effective means of overcoming the problem of intratumor heterogeneity, which has limited the value of conventional biopsy approaches. As a consequence, oncology practice is about to change radically, toward truly personalized precision medicine. This book provides both clinicians and researchers with a thorough and up-to-date overview of progress in the field.

Written by world-renowned scientists, the volume provides a state-of-the-art on the most recent MRI techniques related to MS, and it is an indispensable tool for all those working in this field. The context in which this book exists is that there is an increasing perception that modern MR methodologies should be more extensively employed in clinical trials to derive innovative information.

This volume covers methods for the analysis of extracellular vesicles (EV) that can be applied to isolated EVs from a wide variety of sources. This includes the use of electron microscopy, tunable resistance pulse sensing, and nanoparticle tracking analysis. The chapters in this book discuss EV cargoes containing proteins and genomic materials using a number of different approaches, and isolating EVs from platelets and neuronal 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. Practical and comprehensive, Exosomes and Microvesicles: Methods and Protocols is a valuable resource containing methodologies for anyone interested in researching EVs.

This book focuses on the multitude of functions bacterial membrane vesicles perform in bacterial ecology and pathogenesis as well as in emerging medical and biotechnological applications. Both Gram-negative and Gram-positive bacteria produce membrane-bound nanostructures, known as membrane vesicles, which have a range of functions that include serving as delivery vehicles, providing a means of communication over both spatial and temporal scales, and contributing to bacterial survival and evolution. Topics covered in this book range from the biogenesis and composition of bacterial membrane vesicles to their abundance and biological roles in microbial ecosystems, such as marine environments. In the individual chapters, the involvement of bacterial membrane vesicles in host-pathogen interactions, promoting virulence and in facilitating the establishment of infection is explained. In addition, current knowledge regarding membrane vesicles produced by commensal bacteria and their role in the maturation of the host immune system, as well as the therapeutic potential of bacterial membrane vesicles as delivery systems and innovative nanotechnology-based therapeutics are discussed. This work appeals to a wide readership of students and researchers interested in microbial ecology, mechanism underlying pathogenesis and new avenues in applied microbiology and nanotechnology.

Cells are by nature compelled to live in groups. They develop dependence over signaling cues received from their microenvironment, in particular from other cells, whether of their own “kind” or of a different type. Therefore, communicating with these cells is a critical aspect of their behavior and fate, as they live and die normally or as they undergo disease-related pathological changes, with dramatic repercussions. In
this book, we have asked expert researchers in the field of Intercellular Communication in Cancer to provide chapters on different aspects of interaction between neighboring cells, in the context of cancer diseases. We have specifically focused our efforts on membrane-to-membrane contact-based rather than growth factors-mediated modes of intercellular communications. The contributing authors provide an extensive overview of their respective area of specialization, with an in-depth discussion of the molecular mechanisms of cell-cell interactions, the impact on tumor progression and response to therapies, as well as the cancer diagnostic value of this scientific information. This book aims to introduce essential aspects of the normal and pathological cellular fate and homeostasis to both scientists and clinicians, and also to provide established researchers with an update on the novelties and future directions this expanding field is witnessing.