

Preface

New research on finding effective treatment for breast cancer patients has led to a wealth of new data on a number of different levels that allowed a new understanding of the disease. It further allowed development of new strategies to treat the heterogeneous disease with different and patient-specific approaches. A variety of different efforts on genetic, cell, and molecular levels have been focused on understanding causes that lead to cellular abnormalities, cell migration, epithelial–mesenchymal transition points, and metastasis that have become possible with new research methods. The advent of molecular technologies has significantly improved our understanding of the biological processes underlying breast cancer; targeted therapies are now available to inhibit specific signaling pathways that are aberrant in breast cancer cell populations, and we are now able to image signaling molecules with specific markers in live cells. Progress has also been made in designing nanoparticles that can be utilized for imaging and for targeted breast cancer treatment. The joint initiatives and efforts of advocate patients, breast cancer survivors, basic researchers, statisticians, epidemiologists, and clinicians with specific and combined expertise have allowed close communication for more effective and targeted treatment. Furthermore, reliable animal models are available for specific experimentation, and biopsies from hundreds of patients are now available through a number of different resources including the large Translational Breast Cancer Research Consortium (TBCRC) from fourteen research centers with extensive tissue-banking components.

This book highlights recent advances in our understanding of breast cancer, and it includes review articles of genetics, epigenetics, various aspects of cell and molecular biology, and several other areas of breast cancer that are aimed at determining new intervention sides for treatments and cures of breast cancer. The chapters are written by internationally recognized experts in their specific fields of expertise and include reviews of key topics in the field. Cutting-edge new information is balanced with background information that will be readily understandable for the newcomer, for breast cancer patients, and for the experienced breast cancer researcher alike. All articles will highlight new aspects of specific research topics and

impacts on designing new strategies or identify new targets for therapeutic intervention. The topics addressed are selected to be of interest to patients, scientists, students, and teachers and to all who are interested in expanding their knowledge related to breast cancer imaging, diagnostics, therapeutics, or basic biomedical research on breast cancer.

The book is intended for a large audience as a reference book on the subject and includes the following chapters: Histopathology and Grading of Breast Cancer; Multicentric/Multifocal Breast Cancer: Overview, Biology, and Therapy; The Immune System in Breast Cancer Initiation and Progression: Role of Epithelial to Mesenchymal Transition; Remodeling of the Extracellular Matrix: Implications for Cancer; Biology and Treatment of Basal-Like Breast Cancer; Re-excision After Lumpectomy for Breast Cancer; Novel Antiangiogenic Therapies Using Naturally Occurring and Synthetic Drugs to Combat Progesterin-Dependent Breast Cancer; New Insights on Estrogen Receptor Actions in Hormone-Responsive Breast Cancer Cells by Interaction Proteomics; Reprogramming Breast Cancer Cells with Embryonic Microenvironments: Insights from Nodal Signaling; Metastatic Determinants: Breast Tumor Cells in Circulation; Breast Cancer Epigenetics: Biomarkers and Therapeutic Potential; The Impact of Centrosome Abnormalities on Breast Cancer Development and Progression with a Focus on Targeting Centrosomes for Breast Cancer Therapy; A New Perspective on Cyclin D1: Beyond Cell Cycle Regulation; Gene Signatures of Inflammatory Breast Cancer: Epithelial Plasticity and a Cancer Stem Cell Phenotype; An Integrated Human Mammary Epithelial Cell Culture System for Studying Carcinogenesis and Aging; and New Breast Cancer Treatment Considerations: A Brief Review of the Use of Genetically Modified (Attenuated) Bacteria as Therapy for Advanced and Metastatic Breast Cancer.

It has been a special privilege to edit this book on breast cancer, and I would like to sincerely thank all contributors for their outstanding chapters and for sharing their unique expertise with the breast cancer community. I hope that this book will stimulate further advances in breast cancer research leading to new treatment strategies to effectively treat the disease in early as well as advanced stages.

Columbia, MO, USA

Heide Schatten

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