Molecular Oncology

Causes of Cancer and Targets for Treatment

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This book is dedicated to the scientists who made the discoveries,
to the members of industry who developed the pharmaceuticals,
to the clinicians whose trials turned medicines into therapies,
and to the patients whose participation in research is
essential and whose diseases we work to relieve.

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Preface

This book was conceived more than five years before its publication date. It was intended to provide a resource that summarized technology, biochemistry, molecular pathophysiology, and targeted therapeutics. As contributors were being recruited and chapters written the field that was being described changed at an accelerating pace. It is a tribute to scientific progress that volumes like this are out-of-date as they are published, but books like this are not meant to contain the most current laboratory discovery or report the most recent FDA approval.

While this book was being written there have been major advances in molecular oncology. The Cancer Genome Atlas (cancergenome.nih.gov) has demonstrated the broad spectrum of mutations in an expanding list of cancers. DNA sequence analysis alone has demonstrated that as cancers grow, metastasize, and develop treatment resistance, individual tumor sites within a single patient evolve differently and demonstrate increasingly complex spectra of driver and passenger mutations. These findings alone strongly support the Darwinian view of tumor progression. The complexities of cellular dysregulation in cancer may arise from DNA sequence changes, but extend to other levels of gene regulation. During the writing of this book the role of micro-RNAs (miRNAs) in cancer was elucidated. Aberrations in epigenetics such as DNA methylation and histone acetylation were demonstrated. Cancer drug development has also proceeded at increasing rates. In the period 2008–2012 there were 51 approvals of new drugs for cancer treatment by the US Food and Drug Administration. Many of these approvals resulted from impressive data in Phase II trials that clearly demonstrated efficacy where no agents have worked before.

As we have assembled the contributions for this volume we have watched as more and more information is provided and accessed in electronic format, replacing the printed word. It is not hard to predict that younger generations of investigators will dispense entirely with books and access all information on electronic screens. Clearly a volume like this is meant to provide rapid reference when accessed from a shelf in someone's office.

We the editors took on the task of assembling this volume to provide background for active researchers, to provide meaningful lists of important citations that form the foundation of the molecular pathophysiology of cancer, and to define the context in which current investigation is pursued. This book is intended for students and professionals in academia and industry. Where electronic databases are non-discriminatory and web-based searches can be overwhelming in their download lists, volumes like this provide the perspective and judgment of experts who have spent a very long time in a path of study and therefore share their understanding and viewpoints that are missed in database or electronic literature searches. Volumes like this collect the experience and wisdom of the contributors and therefore provide value and perspective. As journal titles proliferate and the scientific literature expands, it is books like this that guide knowledge and help organize the work in a field into a comprehensible narrative. We hope you find these pages useful.