

PREFACE

Cancer treatment is an area of medicine that has flourished over the last couple of decades, taking advantage of rapid developments in molecular biology and pharmacology. The perspective on cancer and its treatment has changed dramatically not only among those in the public but within the medical profession as well. The diagnosis of cancer used to be thought of as an automatic death sentence and the treatments were considered extremely toxic and futile. Fellow physicians would often ask those of us in medical and radiation oncology why we chose to work in such a depressing area of research and practice. This was an interesting perspective, since such thoughts were expressed by cardiologists and pulmonologists who spent their days taking care of patients with severe congestive heart failure or emphysema; diseases with equally poor prognoses. Clearly cancer was thought of as a particular curse. Family members would urge us to withhold information from sick loved ones, fearing that they would lose all hope if they knew the truth. Those in the public eye would also hide information about the diagnosis from the press. Patients even feared being shunned because some thought that cancer was contagious.

Fortunately, much has changed in the last couple of decades. The public now readily hears about and discusses the disease and has gained much more, but still very incomplete, insight into it causes and treatments. Clearly much of this change in attitude reflects the ability to provide improved curative treatment for those with early stages of cancer. Even those with advanced disease can now gain significant months and years of life with treatment that has tolerable side effects. For example, while a decade ago it was debated if any treatment should be offered those with advanced lung cancer, we now have first, second and third line treatments that have been demonstrated to prolong patient's lives. The agents employed included older and newer cytotoxic drugs along with targeted agents that attack pathways involved in tumor growth and angiogenesis. The future holds many more fortuitous options.

With the availability of a multiplicity of new agents has come a growing need to evaluate the success or failure of each treatment. When no treatment is useful, one clearly has no real need to develop methods to decide which agent to use or for how long. When a number of agents or approaches are available for a given type of cancer we need to assess the patient's prognosis, predict treatment response and then measure the outcome. The initial and still standard approach to measuring outcome relied on determining the size of the tumor. This approach is still very useful, despite its limitations, as is described within this book. The advent of new molecular imaging techniques allows the researcher and clinician to make use of a growing array of imaging devices to peer into tumors in vivo and measure their biochemistry. These include optical, X-ray, magnetic resonance, and nuclear approaches. All of these provide different bits of information about the tumors pathways and metabolism that can be used to understand and predict the best treatment methods and monitor their outcomes. These techniques are now regularly employed in the laboratory and in clinical research to assist in the

development of existing new molecular agents. The new methods of molecular biology have provided a remarkable list of targets and agents that need to be evaluated. At the same time the cost of such testing and development has skyrocketed. While imaging technologies are rather expensive, drug development costs have made such investments seem very reasonable. One clearly needs new ways to understand how agents are working and to figure out what schedule should be used, in which combination, and in which disease, since cancer is not one disease but over one hundred. In fact, the new studies in molecular biology seem to prove that almost each cancer is unique. Hence, each patient must be evaluated to determine the best treatment. The conjunction of these stars has brought together these new therapies and imaging modalities at a critical time in the evolution of modern cancer treatment. This book is aimed at furthering the understanding of how these two fields now work together and will require the close collaboration of those practicing both arts.

As in any book of this type this has been the combined effort of many collaborators. We want to thank our co-authors for their studied contributions to the fields over many years and their efforts to distill their knowledge into a very readable text. We want to thank Janice Akoury and James Cullen, from Detroit and Manchester respectively, for keeping us organized and focused on the tasks needed to complete this effort and for their editing assistance. The support and assistance of Paul Dolgert at Humana Press and Dr. Beverly Teicher made this book possible. We want to thank those who have spent many years teaching us and working with us in the laboratory and clinics to further the fields of cancer therapy and imaging, whose work helped make our careers and this book possible. We want to thank our parents for their guidance and confidence that led to our career paths. Finally, we both want to thank our spouses Drs. Fayth Yoshimura and Terry Jones, both for their encouragement to pursue scientific rigor and years of support.

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