PART II

Clinical Examples of Molecular Oncology

The second half of this book explores clinical examples that demonstrate the basic molecular biology of cancer and the role of oncogenes. I hope to prove to you that the basic science we learned in the first section is not purely theoretical. Basic science immediately leads to new diagnostic techniques and to new therapies. In fact, the second section begins with "Molecular Diagnostics" and concludes with "Molecular Anti-Cancer Therapies." In between, we look at four types of tumors: leukemia/lymphoma, colon cancer, squamous cell carcinoma of the cervix, and breast cancer. The central theme is DNA damage as it accumulates, leading through the multiple steps of cancer development. In chronic myeloid leukemia and Burkitt's lymphoma, we see in detail how a specific oncogene mutation results in cancer. For colon cancer, we see the progressive evolution from benign neoplastic polyp to atypical villous adenoma to invasive cancer with DNA changes occurring at each step. In the following chapter, we consider carcinoma of the cervix as a viral-induced cancer. Should it best be treated or prevented with a vaccine? The chapter on the molecular biology of breast cancer raises as-yet-unanswered questions. Molecular biology will show us why breast cancer is such a clinically complex disease with variable behavior from patient to patient.

This book is not a monograph reporting all that is currently known about the molecular biology of cancer. My goal is to increase our knowledge and understanding of the basic principles and to apply them to a few cancers. Keep in mind that much detail has been omitted to allow these basic principles to stand out clearly. Remember in addition that our knowledge of the molecular biology of cancers is growing rapidly. Each week some discovery reveals, amplifies, and corrects what we thought we knew the week before.