# Preface

Cancer is a complex disease. Only 5–10% of human cancers are hereditary in nature. Many of us think of environmental agents when we think of carcinogens. The environment includes all that surrounds us, and environmental influences include not only chemical, physical and biological toxicants, but also diet and lifestyle. In this broadest sense, the environment contributes substantially in the development of human cancer. Now everyone accepts the role of the environment in causation of cancer but there seems to be an unnecessary struggle to divide the roles of genes and environment as if they are distinct contributors. The ongoing "nature versus nurture" argument is unproductive. Genes and environmental factors work in concert to protect from or to cause cancer and there is no need to worry about the proportion of their relative contribution. There are lessons to be learned from the classic example of phenylketonuria (PKU). In this monogenic disorder, no harm is possible unless the environmental element is involved. One other aspect missing in the current discussions is the spatial and temporal continuity and variability of environmental exposures, and exposure at critical windows. While exposure assessment at a time point and correlations with follow up data is a common research design and the results obtained are still valuable, there is certainly room for improvement.

The overall goal of this book is to comprehensively present conceptual and methodological aspects of the environment and cancer relationship, and to describe the gaps in knowledge. To do so, we invited eminent investigators from around the world to share their expertise. We were fortunate to put together this book, thanks to the generosity of contributors. Thus, this book contain chapters from the world's experts focused on the current knowledge that supports the role of environment in the cancer etiology and in the growth of malignant lesions, and discuss who may be susceptible to environmental influences. There is a comprehensive coverage of most relevant aspects of the cancer and environment relationship incorporating interactions with genetics. Gene–environment interactions are discussed through each specific cancer-based approach to address the question of how genetic variations can influence susceptibility to the individual type of cancer. It also highlights and summarizes epigenetic changes that increase the risk for susceptibility to a particular type of cancer, particularly in the presence of specific environmental factors.

This book is divided into three parts. The first part highlights basic principles of the environment and gene–environment interactions in cancer susceptibility, tools for analysis, and discusses epigenetic changes that increase the risk for susceptibility to a particular type of cancer, particularly in the presence of specific environmental factors. Additionally, it includes chapters on the statistical and epidemiological methodology for study designs and on different modeling approaches to uncover the complexity of cancer pathology that involves the interaction of genes and the environment.

In the second part of the book, gene and environment interactions are discussed for specific cancers to address the question of how genetic variations can modify susceptibility to the effects of environmental factors. In the last part, case studies are presented on specific environmental factors that interact with genes to cause specific types of cancer. Thus, the book encompasses from general to specific approaches to understanding the joint roles played by genes and environment in cancer development and provides statistical and epidemiologic background for analysis of association studies. It is our hope that the readers will be encouraged to design more comprehensive studies for combined analysis of genetic and environmental determinants of cancer susceptibility and for their interactions to fill the gaps in our knowledge.

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