

# Preface

Although it remains an open question among some people whether mice and humans are similar in disease development, the laboratory mouse has emerged as the pre-eminent animal model for human diseases. This is underscored by the recently completed mouse and human genome projects, which have revealed that mice and humans share the vast majority of their genes and thus get many of the same diseases and for the same reasons. For example, many mouse tumor models reflect at least some major characteristics of the corresponding human cancers. It is believed that continuously improved mouse models will play a critical role in understanding disease mechanisms and developing effective therapies for human cancers.

The use of mouse models for cancer research has a long history. In 1929, Dr. Clarence C. Little, a Harvard-trained geneticist, founded The Jackson Laboratory with the vision of generating and using inbred strains of mice to study the genetic basis of cancer. Since then, The Jackson Laboratory has become the world's leading and largest mouse genetics institution for the study and distribution of genetically defined mice, including those that develop cancers. In 1983, the National Institute of Health's National Cancer Institute designated the Laboratory as a National Cancer Center, a status that has been maintained since then. As a cancer researcher at The Jackson Laboratory, I took advantage of the broad range of expertise available here by inviting several Jackson Laboratory cancer researchers to participate in the writing of the book. In addition, to integrate expert opinions from other leading cancer researchers into the book, I invited several outstanding scientists in the blood cancer field outside of The Jackson Laboratory to contribute to the book. I am grateful to have had the opportunity to work with the book contributors, and I have learned a great deal by reading their chapters.

In this book, we emphasize why mouse models are valuable *in vivo* systems for understanding disease mechanisms and developing therapeutic strategies for human blood cancers. We focus on mouse models of blood cancers with the aim of presenting thorough analyses of the pathological features and the molecular bases of the diseases. However, our intent is not to cover all types of blood cancers; instead, we focus on several major types of blood cancer.

Besides the emphases on the description of variable mouse models of human blood cancers and on the study of disease mechanisms using the models, another focus area of the book is to describe translational research using mouse cancer models, including the models that would be valuable but are not yet available. Such translational research includes identification of critical signaling pathways in cancer cells and the development of novel therapeutic strategies against identified molecular targets. Other important topics are also addressed, including the influence of genome instability and dietary restriction on cancer development, and genetic and virological predisposition to lymphoid cell transformation. Furthermore, a novel method for DNA microarray data analysis is introduced as a potentially valuable method for future research using mouse cancer models. I believe that our areas of research focus will distinguish this book from others currently available that cover topics related to the study of human blood cancers in mouse models.

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Bar Harbor, ME

Shaoguang Li



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