

Preface

The past decade witnessed significant efforts and progresses in the area of microRNA (miRNA) research in the field of cancer. Indeed, recent miRNA studies have been a major leap in the understanding of the molecular pathogenesis of cancer. It is crystal clear that miRNAs as either onco- or tumor suppressor genes can alter biological processes fundamental to tumor initiation and progression. The connections between miRNAs and oncogenesis are widespread enough to hold miRNAs as potential therapeutic targets and novel biomarkers. In this regard, identifying the expression signatures of miRNAs provides exciting opportunities for the diagnosis, prognosis, and therapy of cancer.

This edited book *MicroRNAs: Key Regulators of Oncogenesis* aims to offer a broad framework to understand the state-of-the-art knowledge of miRNA function and illustrate features of specific miRNAs in the regulation of cancer. It has been written for graduate students, postdoctoral fellows, and scientists in cancer research, and it is also well suited for clinical oncologists and other researchers interested in this field. The contents of this book was scrupulously designed and explicitly written. Ranging from the fundamental concepts to clinical applications, this book is composed of seventeen chapters organized in two parts. The first part is devoted to delving deep into the importance of miRNAs in cancer biology. In Chap. 1, I describe the dual function of miRNAs as either oncogenes or tumor suppressors in cancer and elucidate the link between aberrant miRNA expression and cancer development and progression. Since cancer is associated with accumulation of epigenetic and genetic alterations, Chap. 2 focuses on the relationship between epigenetics and miRNA. In line with this, Chap. 3 deals exclusively with the effects of dietary agents on miRNAs and their targets in the context of cancer biology. Chapter 4 elaborates on the interplay between miRNAs and oncogenes/tumor suppressors in tumor metabolism introducing another layer of complexity to the regulatory network of metabolic pathways in cancer cells. In Chaps. 5 and 6, authors clearly describe the crucial roles of miRNAs in different types of solid tumors and hematological malignancies and also discuss the feasibility of using miRNAs as potential biomarkers. The importance of miRNAs in the pathogenesis of oncogenic viruses and the link

between miRNAs and liver inflammation during hepatocarcinogenesis is represented in Chaps. 7 and 8, respectively. Chapter 9 deciphers the mechanisms through which miRNAs modulate the activity of regulatory pathways in tumorigenesis, in particular miRNAs targeting potential pathways for therapeutic intervention. Chapter 10 reveals the regulatory mechanisms of miRNAs in apoptotic and autophagic networks, with the merit of finding application as potential drug targets for future cancer therapy. Chapter 11 describes the part played by miRNAs in drug resistance and drug sensitivity. In Chap. 12, the potential role of cancer stem cell-related miRNAs during tumor development and progression is clarified. The second part of the book highlights the clinical implications of miRNAs in cancer. In this part, Chap. 13 introduces miRNAs as potential biomarkers for diagnosis, prognosis and therapeutic intervention of cancer and the capacity of integrating miRNA data into clinical trials is discussed. Chapter 14 offers a precise description to the function of miRNAs in breast cancer and discusses their possible translation into molecular diagnostics. Chapter 15 particularizes the impact of miRNAs on drug resistance from a clinical point of view, thereby highlighting their capability to be exploited as predictors or modifiers of resistance towards chemo- and radio-therapeutics. In Chap. 16, authors meticulously address a variety of nanocarriers exploited for miRNA delivery in crafting therapeutic platforms for cancer and provide an in-depth analysis of different attributes of these nanovehicles. Finally, Chap. 17 outlines the advantages of a pulmonary drug delivery system and the strategies for miRNA-based treatment of lung cancer.

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