# Contents

**Preface** ................................................. v
**Contributors** ............................................ ix

## PART I  REVIEWS

1. MicroRNA Biogenesis and Cancer .......................... 3  
   *Julia Winter and Sven Diederichs*

2. Computational Identification of miRNAs Involved in Cancer ........................................ 23  
   *Anastasis Oulas, Nestoras Karathanasis, and Panayiota Poirazi*

3. The Principles of MiRNA-Masking Antisense Oligonucleotides Technology .......................... 43  
   *Zhiguo Wang*

4. The Concept of Multiple-Target Anti-miRNA Antisense Oligonucleotide Technology ................ 51  
   *Zhiguo Wang*

5. Modulation of MicroRNAs for Potential Cancer Therapeutics ........................................... 59  
   *Wei Wu*

## PART II  PROTOCOLS

6. Detection of MicroRNAs in Cultured Cells and Paraffin-Embedded Tissue Specimens by In Situ Hybridization .......................................................... 73  
   *Ashim Gupta and Yin-Yuan Mo*

7. MicroRNA Northern Blotting, Precursor Cloning, and Ago2-Improved RNA Interference .................. 85  
   *Julia Winter and Sven Diederichs*

8. miRNA Profiling on High-Throughput OpenArray™ System ............................................. 101  
   *Elena V. Grigorenko, Elen Ortenberg, James Hurley, Andrew Bond, and Kevin Munnelly*

9. Silicon Nanowire Biosensor for Ultrasensitive and Label-Free Direct Detection of miRNAs .............. 111  
   *Guo-Jun Zhang*

    *Caide Xiao*

11. MicroRNA Regulation of Growth Factor Receptor Signaling in Human Cancer Cells ................... 147  
    *Keith M. Giles, Andrew Barker, Priscilla M. Zhang, Michael R. Epis, and Peter J. Leedman*
12 Epigenetic Regulation of MicroRNA Expression in Cancer............... 165
   Hani Choudhry and James W.F. Catto

13 In Vitro Functional Study of miR-126 in Leukemia ...................... 185
   Zejuan Li and Jianjun Chen

14 Prediction of the Biological Effect of Polymorphisms
   Within MicroRNA Binding Sites ...................................... 197
   Debora Landi, Roberto Barale, Federica Gemignani,
   and Stefano Landi

15 The Guideline of the Design and Validation of MiRNA Mimics ........... 211
   Zhiguo Wang

16 Analysis of Targets and Functions Coregulated by MicroRNAs ............ 225
   Shu-Jen Chen and Hua-Chien Chen

17 Utilization of SSCprofiler to Predict a New miRNA Gene ................ 243
   Anastasis Oulas and Panayiota Poirazi

18 MicroRNA Profiling Using Fluorescence-Labeled Beads:
   Data Acquisition and Processing ....................................... 253
   Thomas Streichert, Benjamin Otto, and Ulrich Lehmann

Index ......................................................................................... 269