

# NEUROMETHODS

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# RNA Interference Techniques

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## Series Preface

Under the guidance of its founders Alan Boulton and Glen Baker, the Neuromethods series by Humana Press has been very successful since the first volume appeared in 1985. In about 17 years, 37 volumes have been published. In 2006, Springer Science + Business Media made a renewed commitment to this series. The new program will focus on methods that are either unique to the nervous system and excitable cells, or need special consideration to be applied to the neurosciences. The program will strike a balance between recent and exciting developments such as those concerning new animal models of disease, imaging, in vivo methods, and more established techniques, which include immunocytochemistry and electrophysiological technologies. New trainees in neurosciences still need a sound footing in these older methods in order to apply a critical approach to their results. Careful application of methods is probably the most important step in the process of scientific inquiry. In the past, new methodologies led the way in developing new disciplines in the biological and medical sciences. For example, physiology emerged out of anatomy in the nineteenth century by harnessing new methods based on the newly discovered phenomenon of electricity. Nowadays, the relationships between disciplines and methods are more complex. Methods are now widely shared between disciplines and research areas. New developments in electronic publishing also make it possible for scientists to download chapters or protocols selectively within a very short time of encountering them. This new approach has been taken into account in the design of individual volumes and chapters in this series.

*Wolfgang Walz*



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## **Preface**

In 2006, Fire and Mello received the Nobel Prize in Physiology or Medicine for their discovery of RNA interference (RNAi). RNAi refers to posttranscriptional, sequence-specific control of gene expression mediated by small, noncoding inhibitory RNAs, called microRNAs (miRNAs). To date, thousands of conserved and species-specific miRNAs have been identified in organisms ranging from single-celled algae to humans. RNAi and miRNAs are now known to play fundamental roles in developmental biology and disease pathogenesis, although only a small fraction of miRNAs has a known function. RNAi has also emerged as a technology; designer inhibitory RNAs can be engineered to mimic natural miRNAs and suppress any gene of interest. These synthetic inhibitory RNAs have been used to ask basic biological questions or develop therapeutics for dominant genetic disorders, cancer, or viral infection. Thus, the field of RNAi and miRNAs is growing rapidly and gaining increasing importance in basic and translational biology.

This volume presents detailed methods for designing and delivering artificial inhibitory RNAs to neural tissue, and for detecting or cloning endogenous miRNAs.

*Scott Q. Harper*





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# Contents

<i>Series Preface</i> .....	<i>v</i>
<i>Preface</i> .....	<i>vii</i>
<i>Contributors</i> .....	<i>xi</i>
1. Designing Hairpin-Based RNAi Shuttles .....	1
<i>Yu Shen</i>	
2. Rapid Cloning and Validation of MicroRNA Shuttle Vectors: A Practical Guide ..	19
<i>Ryan L. Boudreau, Sara E. Garwick-Coppens, Jian Liu, Lindsay M. Wallace, and Scott Q. Harper</i>	
3. The Use of Small Noncoding RNAs to Silence Transcription in Human Cells . . . .	39
<i>Kevin V. Morris</i>	
4. Delivery Strategies for RNAi to the Nervous System .....	59
<i>Kevin D. Foust and Brian K. Kaspar</i>	
5. Cloning Small RNAs .....	77
<i>Eric J. Devor and Lingyan Huang</i>	
6. Profiling the miRNome: Detecting Global miRNA Expression Levels with DNA Microarrays .....	91
<i>Peter White</i>	
7. High-Throughput Profiling of Mature MicroRNA by Real-Time PCR .....	113
<i>Jinmai Jiang, Eun Joo Lee, Melissa G. Piper, Clay B. Marsh, and Thomas D. Schmittgen</i>	
8. In Situ Detection of MicroRNAs in Paraffin-Embedded, Formalin-Fixed Tissues: Different Methodologies and Co-localization with Possible Targets .....	123
<i>Gerard J. Nuovo, Patrick Nana-Sinkam, Melissa Crawford, and Thomas D. Schmittgen</i>	
9. Tracing of siRNAs Inside Cells by FRET Imaging .....	141
<i>Markus Hirsch, Il-Han Kim, Anne Järve, Roger Fischer, Michael F. Trendelenburg, Ulrich Massing, Karl Robr, and Mark Helm</i>	
10. Application of RIP-Chip for the Identification of miRNA Targets .....	159
<i>Lu Ping Tan, Anke van den Berg, and Joost L. Kluiver</i>	
<i>Index</i> .....	<i>171</i>



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