

Contents

Preface, vii

Introduction, 1

Gregory J. Hannon

1 Sense Cosuppression in Plants: Past, Present, and Future, 5

Richard A. Jorgensen

2 Transgene Cosuppression in Animals, 23

James A. Birchler, Manika Pal-Bhadra, and Utpal Bhadra

3 Regulation of the Genome by Double-stranded RNA, 43

*Marjori Matzke, M. Florian Mette, Tatsuo Kanno, Werner Aufsatz,
and Antonius J.M. Matzke*

4 RNAi in *Caenorhabditis elegans*, 65

René F. Ketting, Marcel Tijsterman, and Ronald H.A. Plasterk

5 Small RNAs, Big Biology: Biochemical Studies of RNA Interference, 87

Gregory J. Hannon and Phillip D. Zamore

6 shRNA-mediated Silencing of Mammalian Gene Expression, 109

Michael T. McManus and Douglas S. Conklin

7 Transposable Elements, RNA Interference, and the Origin of Heterochromatin, 129

*Rob Martienssen, Tom Volpe, Zach Lippman, Ann-Valerie Gendrel,
Catherine Kidner, Pablo Rabinowicz, and Vincent Colot*

8 The Ribonuclease III Superfamily: Forms and Functions in RNA,
Maturation, Decay, and Gene Silencing, 149

Allen W. Nicholson

9 RNA-dependent RNA Polymerase in Gene Silencing, 175

Luyun Huang, John Gledhill, and Craig E. Cameron

10 Structure and Function of Heterochromatin: Implications for Epigenetic
Gene Silencing and Genome Organization, 205

Ira M. Hall and Shiv I.S. Grewal

- 11 Total Interference: Genome-wide RNAi Screens in *C. elegans*, 233
Andrew G. Fraser and Julie Ahringer
- 12 PTGS Approaches to Large-scale Functional Genomics in Plants, 243
Tessa M. Burch-Smith, Jennifer L. Miller, and Savithramma P. Dinesh-Kumar
- 13 Mammalian RNA Interference, 265
Thomas Tuschl
- 14 RNAi in Avian Embryos, 297
Esther T. Stoeckli
- 15 Guide to RNAi in Mouse Oocytes and Preimplantation Embryos, 313
Paula Stein and Petr Svoboda
- 16 RNAi Technologies in *Drosophila* Cell Culture, 345
Scott M. Hammond
- 17 RNAi Applications in *Drosophila melanogaster*, 361
Richard W. Carthew
- 18 RNA Interference in *Trypanosoma brucei* and Other Nonclassical Model Organisms, 401
Elisabetta Ullu and Christian Tschudi

Appendices

- 1 Cautions, 413
- 2 Suppliers, 421

Index, 423