
Contents

| | |
|----------------------------|----|
| Preface | v |
| Contributors..... | xi |
| Contents of Volume I | xv |

PART I: INTRODUCTION

1. Evolution of the Wnt Pathways..... *Jenifer C. Croce and David R. McClay* 3

PART II: DICTYOSTELIUM

2. *Dictyostelium* Development: A Prototypic Wnt Pathway? .. *Adrian J. Harwood* 21
3. Monitoring Patterns of Gene Expression in *Dictyostelium* by β -galactosidase Staining .. *Adrian J. Harwood* 33
4. Use of the *Dictyostelium* Stalk Cell Assay to Monitor GSK-3 Regulation .. *Adrian J. Harwood* 39

PART III: CNIDARIANS

5. Wnt Signaling in Cnidarians .. *Thomas W. Holstein* 47
6. Detecting Expression Patterns of Wnt Pathway Components in *Nematostella vectensis* Embryos .. *Shalika Kumburegama, Naveen Wijesena, and Athula H. Wikramanayake* 55
7. Detection of Expression Patterns in *Hydra* Pattern Formation..... *Hans Bode, Tobias Lengfeld, Bert Hobmayer, and Thomas W. Holstein* 69

PART IV: C. ELEGANS

8. Analysis of Wnt Signaling During *Caenorhabditis elegans* Postembryonic Development .. *Samantha Van Hoffelen and Michael A. Herman* 87
9. Wnt Signaling During *Caenorhabditis elegans* Embryonic Development *Daniel J. Marston, Minna Roh, Amanda J. Mikels, Roel Nusse, and Bob Goldstein* 103

PART V: DROSOPHILA

10. Function of the Wingless Signaling Pathway in *Drosophila* .. *Foster C. Gonsalves and Ramanuj DasGupta* 115
11. Visualization of PCP Defects in the Eye and Wing of *Drosophila melanogaster* .. *Natalia Arbouzova and Helen McNeill* 127
12. Wingless Signaling in *Drosophila* Eye Development .. *Kevin Legent and Jessica E. Treisman* 141

| | | |
|--|---|-----|
| 13. | High-Throughput RNAi Screen in <i>Drosophila</i> | 163 |
| | <i>Ramanuj DasGupta and Foster C. Gonsalves</i> | |
| PART VI: SEA URCHIN | | |
| 14. | Wnt Signaling in the Early Sea Urchin Embryo | 187 |
| | <i>Shalika Kumburegama and Athula H. Wikramanayake</i> | |
| 15. | Detecting Expression Patterns of Wnt Pathway Components in Sea Urchin Embryos | 201 |
| | <i>Joanna M. Bince, Chieh-fu Peng, and Athula H. Wikramanayake</i> | |
| 16. | Functional Analysis of Wnt Signaling in the Early Sea Urchin Embryo Using mRNA Microinjection | 213 |
| | <i>Joanna M. Bince and Athula H. Wikramanayake</i> | |
| PART VII: ZEBRAFISH | | |
| 17. | Wnt Signaling Mediates Diverse Developmental Processes in Zebrafish | 225 |
| | <i>Heather Verkade and Joan K. Heath</i> | |
| 18. | Determination of mRNA and Protein Expression Patterns in Zebrafish | 253 |
| | <i>Elizabeth L. Christie, Adam C. Parslow, and Joan K. Heath</i> | |
| 19. | Manipulation of Gene Expression During Zebrafish Embryonic Development Using Transient Approaches | 273 |
| | <i>Benjamin M. Hogan, Heather Verkade, Graham J. Lieschke, and Joan K. Heath</i> | |
| 20. | Neural Patterning and CNS Functions of Wnt in Zebrafish | 301 |
| | <i>Richard I. Dorsky</i> | |
| PART VIII: XENOPUS | | |
| 21. | Studying Wnt Signaling in <i>Xenopus</i> | 319 |
| | <i>Stefan Hoppler</i> | |
| SECTION A: METHODS FOR STUDYING WNT SIGNALING IN <i>XENOPUS</i> EMBRYOS | | |
| 22. | Analysis of Gene Expression in <i>Xenopus</i> Embryos | 335 |
| | <i>Danielle L. Lavery and Stefan Hoppler</i> | |
| 23. | Detection of Nuclear β -catenin in <i>Xenopus</i> Embryos | 363 |
| | <i>François Fagotto and Carolyn M. Brown</i> | |
| 24. | Transgenic Reporter Tools Tracing Endogenous Canonical Wnt Signaling in <i>Xenopus</i> | 381 |
| | <i>Tinneke Denayer, Hong Thi Tran, and Kris Vleminckx</i> | |
| 25. | Gain-of-Function and Loss-of-Function Strategies in <i>Xenopus</i> | 401 |
| | <i>Danielle L. Lavery and Stefan Hoppler</i> | |
| 26. | How the Mother Can Help: Studying Maternal Wnt Signaling by Anti-sense-mediated Depletion of Maternal mRNAs and the Host Transfer Technique | 417 |
| | <i>Adnan Mir and Janet Heasman</i> | |
| 27. | Inducible Gene Expression in Transient Transgenic <i>Xenopus</i> Embryos | 431 |
| | <i>Grant N. Wheeler, Danielle L. Lavery, and Stefan Hoppler</i> | |

| | | |
|---|---|-----|
| 28. | Wnt-Frizzled Interactions in <i>Xenopus</i> | 451 |
| | <i>Herbert Steinbeisser and Rajeeb K. Swain</i> | |
| SECTION B: WNT SIGNALING FUNCTION IN <i>XENOPUS</i> DEVELOPMENT | | |
| 29. | Dorsal Axis Duplication as a Functional Readout for Wnt Activity | 467 |
| | <i>Michael Kühl and Petra Pandur</i> | |
| 30. | Regulation of Convergent Extension by Non-canonical Wnt Signaling in the <i>Xenopus</i> Embryo | 477 |
| | <i>Lars F. Petersen, Hiromasa Ninomiya, and Rudolf Winklbauer</i> | |
| 31. | Frizzled-7-dependent Tissue Separation in the <i>Xenopus</i> Gastrula | 485 |
| | <i>Rudolf Winklbauer and Olivia Luu</i> | |
| | <i>Index</i> | 493 |