

AQUACULTURE BIOTECHNOLOGY

Garth L. Fletcher &
Matthew L. Rise

 WILEY-BLACKWELL



Contents

Preface	xi
<i>Garth L. Fletcher and Matthew L. Rise</i>	
Contributors	xv
Part 1: Broodstock Improvement	1
Chapter 1 Genomic Tools for Understanding the Molecular Basis of Production-Relevant Traits in Finfish	3
<i>Marije Booman and Matthew L. Rise</i>	
Chapter 2 Advances in Genomics and Genetics of Penaeid Shrimp	21
<i>Javier Robalino, Robert W. Chapman, Enrique de la Vega, Nuala A. O'Leary, Danielle M. Gorbach, Zhi-Qiang Du, Max F. Rothschild, Craig L. Browdy, Gregory W. Warr, and Yannick Labreuche</i>	
Chapter 3 Genetic and Genomic Approaches to Atlantic Halibut Broodstock Management	43
<i>Michael Reith, Darrin Reid, Debbie Martin-Robichaud, and Tillmann Benfey</i>	
Chapter 4 Prospects and Pitfalls of Clonal Fishes in the Postgenomic Era	55
<i>Barrie D. Robison and Gary H. Thorgaard</i>	
Part 2: Molecular Cytogenetics	69
Chapter 5 Application of Fluorescence In Situ Hybridization (FISH) to Aquaculture-Related Research	71
<i>Ruth B. Phillips</i>	
Part 3: Fish Health	81
Chapter 6 The Application of Genomics, Proteomics, and Metabolomics to Studies of Fish Health	83
<i>Stewart C. Johnson and Laura L. Brown</i>	
Chapter 7 Antimicrobial Peptides and Their Potential as Therapeutants in Aquaculture	105
<i>Susan E. Douglas</i>	

Chapter 8	Adaptive Immunity in Finfish: A Physiological Perspective <i>Brian Dixon and Leandro A. Becker</i>	121
Part 4: Viral Pathogens and Diseases		139
Chapter 9	Structural Biology and Functional Genomics of the Shrimp White Spot Syndrome Virus and Singapore Grouper Iridovirus <i>Jinlu Wu, Zhengjun Li, and Choy L. Hew</i>	141
Chapter 10	DNA Vaccines for Viral Diseases of Farmed Fish and Shellfish <i>Jo-Ann C. Leong, Kristine Romoren, and Oystein Evensen</i>	153
Part 5: Embryogenesis and Stem Cells		175
Chapter 11	Egg Transcriptome, the Maternal Legacy to the Embryo <i>Juan Martin Traverso, Alexis Fostier, and Julien Bobe</i>	177
Chapter 12	Application of Fish Stem Cell Technology to Aquaculture and Marine Biotechnology <i>Ten-Tsao Wong and Paul Collodi</i>	193
Chapter 13	Culture of Fish Head Kidney Mononuclear Phagocytes and Muscle Satellite Cells: Valuable Models for Aquaculture Biotechnology Research <i>Frederick W. Goetz, Josep V. Planas, Mònica Díaz, Dimitar B. Iliev, and Simon MacKenzie</i>	207
Chapter 14	Germ Cell Transplantation in Fish: Basic Biology and Biotechnological Applications <i>Goro Yoshizaki, Tomoyuki Okutsu, and Yutaka Takeuchi</i>	223
Part 6: Gene Transfer		233
Chapter 15	Spatial and Temporal Regulation of Transgene Expression in Fish <i>Ryan MacDonald and Marc Ekker</i>	235
Chapter 16	Antifreeze Protein Gene Transfer—Promises, Challenges, and Lessons from Nature <i>Garth L. Fletcher and Peter L. Davies</i>	253
Chapter 17	Potential Applications of Transgenic Fish to Environmental Monitoring and Toxicology <i>Hwee Boon Grace Ng, Siew Hong Lam, Hendrian Sukardi, and Zhiyuan Gong</i>	267
Chapter 18	Transgenic Tilapia for Xenotransplantation <i>James R. Wright Jr., Olga Hrytsenko, and Bill Pohajdak</i>	281
Chapter 19	The Potential of Enhancing Muscle Growth in Cultured Fish through the Inhibition of Members of the Transforming Growth Factor- β Superfamily <i>Michael P. Phelps and Terence M. Bradley</i>	291
Part 7: Cryopreservation		303
Chapter 20	Fish Gamete and Embryo Cryopreservation: State of the Art <i>Paz Herráez, Elsa Cabrita, and Vanesa Robles</i>	305

Part 8: Environmental Considerations 319

- Chapter 21 The Potential Ecological and Genetic Impacts of Aquaculture Biotechnologies:
Eco-Evolutionary Considerations for Managing the Blue Revolution 321
Derek T.R. Moreau and Ian A. Fleming

Part 9: Ethical Issues 343

- Chapter 22 Aquaculture Ethics in the Biotechnology Century 345
Lyne Létourneau

- Index 355

Color plates appear between pages 222 and 223.