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The Zebrafish: disease models and chemical screens, 4th Edition

Edited by
H. William Detrich III, Monte Westerfield,
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The Zebrafish: Disease Models and Chemical Screens

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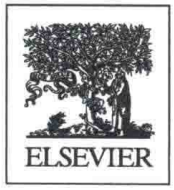

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Methods in Cell Biology

The Zebrafish: Disease Models and Chemical Screens

Volume 138

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Len, Monte, and I dedicate the 4th Edition of Methods in Cell Biology: The Zebrafish *to the postdoctoral fellows and graduate students who conducted the genetic screens that established the zebrafish as a preeminent vertebrate model system for analysis of development.*

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Preface

Len, Monte, and I are pleased to introduce the Fourth Edition of *Methods in Cell Biology: The Zebrafish*. The advantages of the zebrafish, *Danio rerio*, are numerous, including its short generation time and high fecundity, external fertilization, and the optical transparency of the embryo. The ease of conducting forward genetic screens in the zebrafish, based on the pioneering work of George Streisinger, culminated in screens from the laboratories of Wolfgang Driever, Mark C. Fishman, and Christiane Nüsslein-Volhard, published in a seminal volume of *Development* (Volume 123, December 1, 1996) that described a "candy store" of mutants whose phenotypes spanned the gamut of developmental processes and mechanisms. Life for geneticists who study vertebrate development became *really* fine.

Statistics derived from ZFIN (The Zebrafish Model Organism Database; http://zfin.org/cgi-bin/webdriver?MIval=aa-ZDB_home.apg) illustrate the dramatic growth of research involving zebrafish. The zebrafish genome has been sequenced, and as of 2014, more than 25,000 genes have been placed on the assembly. Greater than 15,500 of these genes have been established as orthologs of human genes. The zebrafish community has grown from ~1400 researchers in 190 laboratories as of 1998 to ~7000 in 930 laboratories in 2014. The annual number of publications based on the zebrafish has risen from 1913 to 21,995 in the same timeframe. Clearly, the zebrafish has arrived as a vertebrate biomedical model system *par excellence*.

When we published the First Edition (Volumes 59 and 60) in 1998, our goal was to encourage biologists to adopt the zebrafish as a genetically tractable model organism for studying biological phenomena from the cellular through the organismal. Our goal today remains unchanged, but the range of subjects and the suite of methods have expanded rapidly and significantly in sophistication over the years. With the Second and Third Editions of *MCB: The Zebrafish* (Volumes 76 and 77 in 2004; Volumes 100, 101, 104, and 105 in 2010–11), we documented this extraordinary growth, again relying on the excellent chapters contributed by our generous colleagues in the zebrafish research community.

When Len, Monte, and I began planning the Fourth Edition, we found that the zebrafish community had once more developed and refined novel experimental systems and technologies to tackle challenging biological problems across the spectrum of the biosciences. We present these methods following the organizational structure of the Third Edition, with volumes devoted to *Cellular and Developmental Biology*, to *Genetics, Genomics, and Transcriptomics*, and to *Disease Models and Chemical Screens*. Here we introduce the fourth volume, *Disease Models and Chemical Screens*.

Disease Models and Chemical Screens covers major technical advances in development of the zebrafish as an important biomedical model organism. Nine sections are devoted to adipose tissue, the innate and adaptive immune systems, blood and lymph, visceral organs, the musculoskeletal system, central and sensory nervous systems, cancer, transplantation, and chemical screening. We anticipate that you,

our readership, will apply these methods successfully in your own zebrafish research programs and will develop your own disease models that may be considered for a future edition of *Methods in Cell Biology: The Zebrafish*.

We thank the series editors, Leslie Wilson and Phong Tran, and the staff of Elsevier/Academic Press, especially Zoe Kruze and Hannah Colford, for their enthusiastic support of our Fourth Edition. Their help, patience, and encouragement are profoundly appreciated.

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