

New Principles in Developmental Processes

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Editors

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 Springer

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Preface

Through modern investigations during the past decade, developmental biology has experienced a revolutionary change. The molecular and cellular processes in live embryos can now be visualized thanks to technologies using fluorescent proteins. The whole-genome information of a wide range of animal species has now become available, confirming the common principles that operate regardless of the particular species. These and other advances in our understanding of developmental processes during embryogenesis and tissue regeneration now allow us to formulate new principles, and it is high time to do so. The stem cell sciences, which branched from developmental biology, also require these new principles to generate a particular tissue by manipulating stem cells.

This book does not aim to cover the entire developmental biology field, which standard textbooks do. Instead, the book highlights representatives of emerging new principles, such as cell competition, tissue asymmetry, a farewell to classical germ layer theory, and various new insights into tissue morphogenesis and specification based on the most modern experimental approaches. The book will thus complement the major textbooks that tend to emphasize a chronological order of events and a comparison of animal models. This book, by contrast, focuses on the commonality of principles underlying diverse developmental processes that take place in different spatiotemporal contexts of development or in phylogenetically distant animal species.

New Principles in Developmental Processes was planned to introduce these new principles to readers working in developmental biology and stem cell biology fields, with an emphasis on genetic and cellular processes. The leading researchers in the new generation of developmental biologists were invited to be the authors who would undertake this task.

We expect two kinds of audiences: an academic audience in the developmental biology field, and a professional audience among those who are involved in stem cell sciences and biomedicine. We hope that the book will be widely read by those at the undergraduate, graduate, and postdoctoral levels as supplementary reading for textbooks because of its unique capability to complement those books.

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