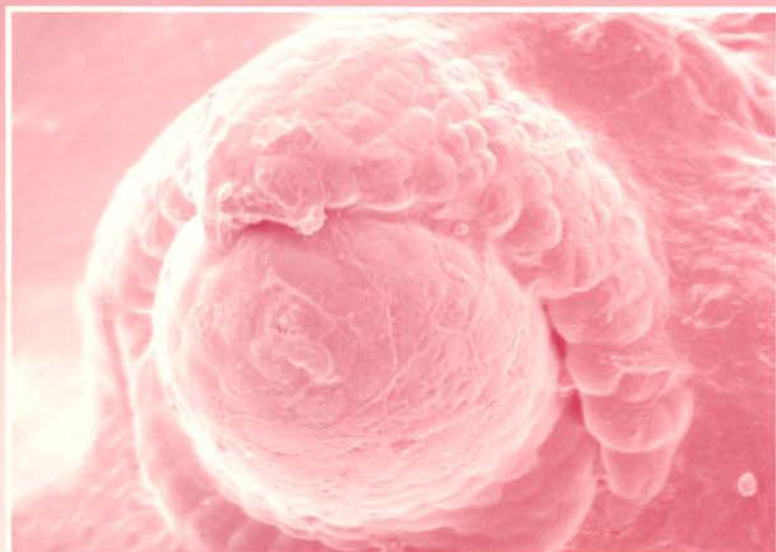


Current Topics in Developmental Biology

Edited by

Roger A. Pedersen

Volume 28



**Current Topics in
Developmental Biology**

Volume 28

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Roger A. Pedersen
Laboratory of Radiobiology
and Environmental Health
University of California
San Francisco, CA 94143-0750

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Photo courtesy of Toshi Foster. (For more details see Chapter 2, Figure 1.)

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Contributors

Numbers in parentheses indicate the pages on which the authors' contributions begin.

David F. Albertini, Department of Anatomy and Cellular Biology, Tufts University Schools of Medicine, Boston, Massachusetts 02111 (125)

Danny L. Brower, Department of Molecular and Cellular Biology, and Department of Biochemistry, University of Arizona, Tucson, Arizona 85721 (81)

Thomas A. Bunch, Department of Molecular and Cellular Biology, and Department of Biochemistry, University of Arizona, Tucson, Arizona 85721 (81)

Michael Freeling, Department of Plant Biology, University of California, Berkeley, Berkeley, California 94720 (47)

Sarah Hake, Department of Plant Biology, University of California, Berkeley, Berkeley, California 94720 and USDA/ARS Plant Gene Expression Center, Albany, California 94710 (47)

David P. Hill, Samuel Lunenfeld Research Institute of Mt. Sinai Hospital, Division of Molecular and Developmental Biology, Toronto, Ontario, Canada M5G 1X5 (181)

Oded Khaner, Department of Cell and Animal Biology, The Institute of Life Sciences, The Hebrew University, Jerusalem, Israel 91904 (155)

William F. Loomis, Department of Biology, Center for Molecular Genetics, University of California, San Diego, La Jolla, California 92093 (1)

Neelima Sinha, Department of Plant Biology, University of California, Berkeley, Berkeley, California 94720 (47)

Dineli Wickramasinghe, Department of Anatomy and Cellular Biology, Tufts University Schools of Medicine, Boston, Massachusetts 02111 (125)

Wolfgang Wurst, Samuel Lunenfeld Research Institute of Mt. Sinai Hospital, Division of Molecular and Developmental Biology, Toronto, Ontario, Canada M5G 1X5 (181)

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Preface

No one who reflects on recent progress in cellular, molecular, and genetic aspects of developmental biology can escape the impact of the recent discoveries that certain functions of homeobox-containing genes in pattern formation have been conserved during evolution from arthropods to vertebrates. Similarly profound implications arise from the discovery that genes involved in cell cycle regulation are strongly conserved between yeasts and mammals. The message from these insights is that fundamental mechanisms regulating growth, differentiation, and morphogenesis arose from singular evolutionary events that have been universally propagated into current life forms. One's grasp of a principle underlying mouse development, for example, may therefore come as likely from studying *Dictyostelium* migration or *Drosophila* morphogenesis as from studying fish or frogs.

Accordingly, this volume of "Current Topics in Developmental Biology" continues to address basic issues of developmental mechanisms in a variety of experimental systems. The volume is organized by systematic classification, beginning with plants and lower eukaryotes, and then dealing with animals by increasing levels of biological organization. The chapter by Sinha, Hake, and Freeling analyzes leaf morphogenesis, reviewing a combination of traditional descriptive techniques, molecular genetic experiments and clonal and mutational analysis to account for the enormous natural variation in leaf form. The chapter by Loomis evaluates the evidence for competitive inhibition between prestalk and prespore cells in the lower eukaryote, *Dictyostelium discoideum*, as a model for cell-type proportioning in a wide variety of metazoa. Wickramasinghe and Albertini discuss the regulation of the cell cycle in mitosis and meiosis, emphasizing the role of M-phase kinases, phosphatases, and their substrates during oocyte growth and maturation. In their chapter, Bunch and Brower review the functions of cell adhesion molecules in *Drosophila*, showing their importance in differentiation and morphogenesis. The chapter by Khaner describes the processes leading to bilateral symmetry in the chick embryo, focusing on the role of the hypoblast in axis determination. Finally, Hill and Wurst review the use of spontaneous, chemically induced and DNA-mediated insertional mutagenesis to analyze mammalian development, particularly as applicable to *in vitro* studies with pluripotent embryonic stem cells.

These chapters introduce the reader to important recent advances in understanding the mechanisms of cell proliferation, differentiation, and morpho-