

Preface

My purpose in preparing “Mouse Development. From Oocyte to Stem Cells” for the Springer series “Results and Problems in Cell Differentiation” was to create a comprehensive review of the current knowledge on the most popular mammalian model in developmental biology. Most scientific achievements that have had an important impact on the understanding of basic mechanisms governing embryo development in humans originated from mouse experimental embryology. Stem cell research, which now offers the promise of regenerative medicine, began with the derivation of mouse embryonic stem cells. One of the authors of this pioneering research—Martin Evans—was awarded the Nobel Prize in Medicine or Physiology in 2007. Attracting the experts to create this book I was hoping to provide an overview of mouse development, spanning from oocytes and early embryos to the state-of-the-art description of embryonic and adult stem cells. The book begins with different aspects of mouse oocyte biology, mostly gene expression control at various levels of complexity, and the oocyte-to-embryo transition. Special attention is focused on the currently most vigorously discussed and controversial issues concerning mechanisms involved in the earliest steps of cells diversification occurring just before and during blastocyst formation. As the topic is very hot and highly discussed, five independent views are presented. The authors of these chapters used different methods in their research and emphasized different aspects of processes leading to the blastocyst formation. However, despite their conclusions diverge, they share several important common points which, I hope, will allow to develop a cohesive vision. Further chapters are devoted to the control of development of selected organs or tissues with emphasis at transdifferentiation, transdetermination, and involvement of stem cells. Examples of ecto-, meso-, and endoderm-derived stem cells are presented. Finally, induced pluripotent stem cells are discussed. The book, thus, speak on mouse development starting from oogenesis and finishing on aging.

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Mouse Development

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