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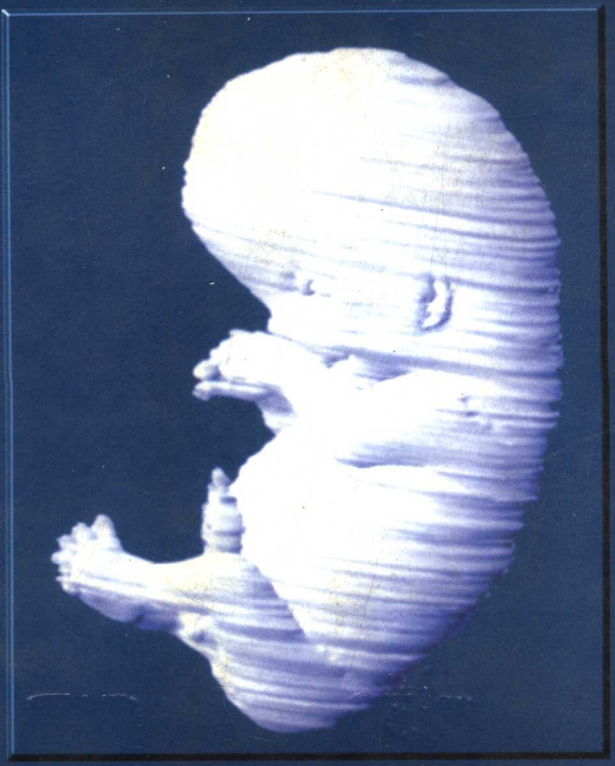
Patten's
Foundations of Embryology
胚胎学基础



Sixth Edition

Bruce M. Carlson

（英文影印版）

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作　　者：Bruce M. Carlson
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PREFACE

Since the fifth edition of the *Foundations of Embryology* was published in 1988, the field of embryology has undergone revolutionary changes. Rapidly developing techniques in molecular biology and in manipulation of the genetic makeup of embryos, especially the mouse, have added an immense store of new data to our knowledge of embryonic development. Many of these new approaches have stemmed from the field of *Drosophila* developmental genetics. Equally important is the demonstration that many of the genes that govern developmental events in *Drosophila* have persisted with amazingly few changes over hundreds of millions of years and are found to play equally important roles in vertebrate embryos. The speed with which new knowledge is accumulating is breathtaking; not a month goes by without new genes being discovered or new functions for other genes being ascertained. Much of the new molecular knowledge is highly descriptive in nature, but increasingly common are studies in which molecular description is combined with genetic or experimental manipulation. It is still too early to provide a complete flowchart of molecular and genetic control of embryonic development, but in some organ systems great progress is being made.

With such an explosion of new knowledge, the writer of an introductory textbook of vertebrate embryology is placed in a dilemma. How much of the traditional descriptive and experimental embryology should be retained and how much of the "new embryology" should be added? The total base of knowledge is now so great that even summarizing our entire fund of knowledge would result in a tome that would overwhelm the beginning student.

For the sixth edition of *Foundations of Embryology* I have opted to maintain the approach of presenting the story of vertebrate embryonic development from fertilization to birth in a manner that will allow the student to visualize the fundamental morphological aspects of development. Merely describing morphology, however, would be a disservice because the student would not be exposed to the experimental, molecular, and genetic approaches that have so increased our understanding of the mechanisms underlying the development of form and function. Although the text revolves about a sys-

tematic morphological description of the formation of organ systems, I have whenever possible introduced the student to incisive experiments or molecular studies that illuminate underlying mechanisms. Because genes found in *Drosophila* play such an important role in a contemporary understanding of normal and abnormal vertebrate development, short introductory sections on the genetic control of early *Drosophila* development and on homeobox genes have been added to the text. Throughout the text, references to important molecular events in the development of specific organs have been added.

Changes in the text are as follows:

(1) Updating of techniques used to study embryos (Chap. 1)

(2) Significant updating on fertilization, especially in mammals, and the separation of the fertilization section into a separate chapter (Chap. 3).

(3) Major updating in the sections on polarity and induction in early amphibian embryos (Chap. 5).

(4) Updating on cell movements and their control during gastrulation (Chap. 6).

(5) Inclusion of much new information on neurulation and somite biology in Chap. 7.

(6) Presentation of the basic elements of homeobox genes and their role in level-specific control of segmentation (Chap. 9).

(7) Presentation of the role of myogenic regulatory factors (Chap. 10).

(8) Integration of new molecular knowledge into the flow of factors controlling limb development (Chap. 12).

(9) Inclusion of major sections on induction of the floor plate, neuromeric segmentation and homeobox gene expression in Chap. 13.

(10) Addition of a new separate chapter on neural crest (Chap. 14).

(11) Complete reorganization of the chapters on development of the head and pharynx, including introductions to molecular correlates of development (Chap. 16).

(12) Major updates on kidney development and sexual differentiation (Chap. 18).

(13) Updating of section on hematopoiesis, as well as molecular controls and neural crest contributions to heart development (Chap. 19).

(14) Reorganization of the Appendix, to eliminate text and to consolidate the drawings of whole mount and sections embryos.

For the production of this edition, I extend my thanks to Lisa Bush for her excellent computer-based artwork, which was always cheerfully delivered. My secretary, Sharon Moskwiak, was helpful as always in formatting and organizing the materials that I brought to her. The reviewers provided a number of very helpful comments, most of which led to significant improvements in the manuscript. Finally, I would like to thank the editorial and production staff at McGraw-Hill for their efforts.

Bruce M. Carlson

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