
P A T T E N ' S
F O U N D A T I O N S
O F E M B R Y O L O G Y

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B R U C E M . C A R L S O N

PATTEN'S FOUNDATIONS OF EMBRYOLOGY

FIFTH EDITION

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TO JEAN AND THE KIDS

PREFACE

In preparing the fifth edition of the *Foundations of Embryology*, I have made some major changes in and revisions of the previous edition. Approximately 40 percent of the text of this edition is new, and over 100 new illustrations have been added. Yet the fundamental objective of the book remains unchanged: to provide a coherent description of normal embryonic development so that the student will acquire an organizational frame of reference for understanding more advanced concepts of the mechanisms of both normal and abnormal development.

Presentation of the normal morphology of development, however, is not the sole goal of this text. In contemporary developmental biology the ideal goal is to integrate morphological, experimental, molecular, and conceptual approaches to studying development. If all these approaches were presented in any detail, the text would become unmanageably large for standard college courses. Therefore, it has been necessary to set up priorities for the depth in which material is presented. As before, the backbone of this introductory text is a coherent description of the way in which the fertilized egg develops into a free-living organism. However, in this edition the treatment of developmental anatomy per se has been streamlined so that students with only a single course in introductory biology should be able to follow the text. I believe that it is important for students to know what causes the structures they see in the laboratory to form. Thus I have placed considerable emphasis on the tissue interactions, migrations, substrate relations, etc., that are involved in this process. Treatment of such areas involves not only the facts but the techniques used to obtain new data. Areas where biochemical or molecular investigations have made major contributions to our understanding of development have also been included in this edition, but for economy of space the techniques used to obtain these data have not been described in great detail. A major goal of this edition has been to show where some of the well-investigated model systems currently popular in developmental biology relate to the systematic study of embryogenesis. This is designed to facilitate the student's ability to relate different ways of studying development to one another.

Major specific changes in the text are as follows:

- (1) Addition of sea urchin and mouse fertilization and early development (Chaps. 3 through 5),
- (2) Greatly increased emphasis on the role of the extracellular matrix and cell adhesion molecules in development (Chap. 1 and many others),
- (3) Expansion of coverage of the neural crest and somitogenesis (Chap. 6),
- (4) Addition of a general section of cytodifferentiation and major updating of muscle and cartilage differentiation (Chap. 9),
- (5) Addition of a new chapter on the skin (Chap. 10),
- (6) Greater emphasis on the use of genetic mutants in the study of development (several chapters),
- (7) Complete reorganization of the chapter on the nervous system (Chap. 12),
- (8) Inclusion of a number of summary tables throughout the text,
- (9) Reduction in the length of the Appendix.

As always, a book of this type is the product of a joint effort of a number of people besides the author. Margaret Croup, who again prepared the new artwork for this edition, continued to work magic with the crude sketches and ideas that were presented to her. The sage advice of William Brudon, who did the artwork for the third edition, has been appreciated by both of us. Thanks to the expertise and hard work of Jackie Rodgers, the entire text was entered into a word processor in a manner that resulted in a great saving of time for me. A number of scientific colleagues were very gracious in allowing the use of their original illustrations to clarify the text. Special thanks are due to my teaching partner, Kathryn Tosney, for ideas and comments as well as for supplying me with a number of her beautiful scanning electron micrographs of embryos. The reviewers of the manuscript were very helpful with their comments and suggestions. Finally, I would like to thank the editorial and production staff at McGraw-Hill for their efforts.

Bruce M. Carlson

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