

Preface

Developmental biology is at the core of all biology of multicellular organisms. It deals with the process by which the genes in the fertilized egg control cell behavior in the embryo and so determine the nature of the animal or plant. Evolution operates by changing the development of the organism so that a better-adapted form develops. With the application of advances in cell and molecular biology, the progress in developmental biology in recent years has been remarkable, and an enormous amount of information is now available. In this third edition we have included many recent advances, for example in the understanding of axis formation, neural development, and stem cells, and this new material is complemented by additional illustrations.

Principles of Development is designed for undergraduates and the emphasis is on principles and key concepts. Central to our approach is that development can be best understood by understanding how genes control cell behavior. We have assumed that students have some basic familiarity with cell biology and genetics, but all key concepts, such as the control of gene activity, are explained in the text.

Conscious of the pressures on students, we have tried to make the principles as clear as possible and to provide numerous summaries, in both words and pictures, and have tried to avoid providing too much detail. The illustrations in this book are a special feature and have been carefully designed and chosen to illuminate both experiments and mechanisms.

We have resisted the temptation to cover every aspect of development and have, instead, focused on those systems that best illuminate common principles. Indeed, a theme that runs throughout the book is that universal principles govern the process of development. At all stages, what we included has been guided by what we believe undergraduates should know about development.

We have thus concentrated our attention on vertebrates and *Drosophila*, but not to the exclusion of other organisms, such as the nematode and the sea urchin, where they best illustrate a concept. Because *Drosophila* development is so well understood and has been so influential, in this edition we have started the book with it rather than with vertebrates. An important feature of our book is the inclusion of plant development, which is usually neglected in general textbooks of developmental biology. There have been striking advances in the understanding of plant development in recent times, and some unique and important features have emerged.

A departure from previous editions is the inclusion of the descriptions of the embryology and genetics of our model organisms as parts of the chapters that primarily deal with their early development, rather than placing them together in a separate chapter.

The emphasis in the book is on early development and the laying down of body plans and organ systems, such as limbs and the nervous system, but we also include later aspects of development, including growth and regeneration. The book concludes with a consideration of evolution and development.

In providing further reading, our prime concern has been to guide the student to helpful papers rather than to give credit to all the scientists who have made major contributions: to those whom we have neglected, we apologize.

For this new edition we welcome Elizabeth Robertson as a co-author. Each chapter has also been reviewed by a number of experts (see page xix), to whom we give thanks. I made the initial revisions, which were then deciphered, edited, and incorporated by our editor Eleanor Lawrence, whose expertise and influence pervades the book. The new illustrations were brilliantly drawn or adapted by Matthew McClements, who created the illustrations for the first edition.

We are indebted to Ruth Hughes and Jonathan Crowe at Oxford University Press, for their help and patience throughout the preparation of this new edition.

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