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List of boxes

Reviewer acknowledgments

Chapter 1 History and basic concepts

The origins of developmental biology

1.1 Aristotle first defined the problem of

epigenesis versus preformation

■ Box 1A Basic stages of *Xenopus laevis* development

1.2 Cell theory changed how people thought about

embryonic development and heredity

1.3 Two main types of development were originally proposed

■ Box 1B The mitotic cell cycle

1.4 The discovery of induction showed that one group of

cells could determine the development of neighboring cells

1.5 Developmental biology emerged from the coming

together of genetics and embryology

1.6 Development is studied mainly through selected

model organisms

1.7 The first developmental genes were identified as

spontaneous mutations

Summary

A conceptual tool kit

1.8 Development involves the emergence of pattern,

change in form, cell differentiation, and growth

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developmental processes

1.10 Genes control cell behavior by specifying

which proteins are made

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under tight control

■ Box 1D Visualizing gene expression in embryos

1.12 Development is progressive and the fates

of cells become determined at different times

1.13 Inductive interactions make cells different

from each other

■ Box 1E Signal transduction and intracellular

signaling pathways

1.14 The response to inductive signals depends

on the state of the cell

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1.15 Patterning can involve the interpretation

of positional information

■ Box 1F When development goes awry

1.16 Lateral inhibition can generate spacing patterns

1.17 Localization of cytoplasmic determinants and asymmetric

cell division can make daughter cells different from each other

1.18 The embryo contains a generative rather than

a descriptive program

1.19 The reliability of development is achieved

by various means

1.20 The complexity of embryonic development is due to the

complexity of cells themselves

1.21 Development is a central element in evolution

Summary

Summary to Chapter 1

Chapter 2 Development of the *Drosophila*

body plan

Drosophila life cycle and overall development

2.1 The early *Drosophila* embryo is a multinucleate syncytium

2.2 Cellularization is followed by gastrulation

and segmentation

2.3 After hatching, the *Drosophila* larva develops

through several larval stages, pupates, and then undergoes

metamorphosis to become an adult

2.4 Many developmental genes were identified in *Drosophila*

through induced large-scale genetic screening

■ Box 2A Mutagenesis and genetic screening strategy

for identifying developmental mutants in *Drosophila*

Summary

Setting up the body axes

2.5 The body axes are set up while the *Drosophila*

embryo is still a syncytium

2.6 Maternal factors set up the body axes and direct

the early stage of *Drosophila* development

2.7 Three classes of maternal genes specify the

antero-posterior axis

2.8 Bicoid protein provides an antero-posterior

gradient of a morphogen

2.9 The posterior pattern is controlled by the gradients

of Nanos and Caudal proteins

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