

This book is the first in a projected series on *Evolutionary Cell Biology*, the intent of which is to demonstrate the essential role of cellular mechanisms in transforming the genotype into the phenotype by transforming gene activity into evolutionary change in morphology. This book — *Cells in Evolutionary Biology* — evaluates the evolution of cells themselves and the role cells have been viewed to play as agents of change at other levels of biological organization. Chapters explore Darwin's use of cells in his theory of evolution and how Weismann's theory of the separation of germ plasm from body cells brought cells to center stage in understanding how acquired changes to cells within generations are not passed on to future generations. The study of evolution through the analysis of cell lineages during embryonic development dominated evolutionary cell biology until usurped by the switch to genes as the agents of heredity in the first decades of the 20th century. Discovery that cells exchanged organelles via symbiosis led to a fundamental reevaluation of prokaryotic and eukaryotic cells and to a reorganizations of the Tree of Life. Identification of cellular signaling centers, of mechanisms responsible for cellular patterning, and of cell behavior and cellular condensations as mediating the plasticity that enables phenotypic change during evolution, provided powerful new synergies between cell biology and evolutionary theory and the basis for *Evolutionary Cell Biology*.

KEY FEATURES

- Summarizes the long history of the essential role of cells in evolutionary change
- Demonstrates that cellular processes transform genetic change into phenotypic change in development and in evolution
- Documents the evidence that cells provide the missing mechanistic link between the genotype and the phenotype in evolutionary theory
- Illustrates the necessity of integrating cell biology into evolutionary theory

Future books in the series will examine the evolution of individual cell types (notochordal, neural crest, placodal, stem and set-aside cells), evolution of the cell cycle, the evolution of segmentation, and more.

RELATED TITLES

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