

Accuracy

in

Molecular Processes

ITS CONTROL AND RELEVANCE TO LIVING SYSTEMS

Edited by

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Preface

Molecular biology proceeds at unremitting pace to unfold new secrets of the living world. Biology, long regarded as an inexact companion to physics and chemistry, has undergone transformation. Now, chemical and physical principles are tools in understanding highly complex biomolecular processes, whose origin lies in a history of chance, constraint and natural selection. The accuracy of these processes, often remarkably high, is crucial to their self-perpetuation, both individually and collectively, as ingredients of the organism as a whole.

In this book are presented thirteen chapters which deal with various facets of the accuracy problem. Subjects covered include: the specificity of enzymes; the fidelity of synthesis of proteins; the replication and repair of DNA; general schemes for the enhancement of biological accuracy; selection for an optimal balance between the costs and benefits of accuracy; and the possible relevance of molecular mistakes to the process of ageing. The viewpoints are distinct, yet complementary, and the book as a whole offers to researchers and students the first comprehensive account of this growing field.

The idea of a book on accuracy in molecular processes was inspired first by a workshop organized in 1978 by Jacques Ninio (a contributor to this volume) with the sponsorship of the European Molecular Biology Organization. So successful was this meeting that two further workshops on similar lines were held in 1981 and 1985. Many of the contributors to this book participated in these workshops, and the book has benefited substantially from the sustained, informal exchange of views which the workshops have helped to bring about. The book is entirely independent, however, of these conferences.

We are grateful to all contributors for the care and patience with which they have written and, where necessary, revised their chapters, and to numerous of our colleagues for helpful comments and suggestions. We thank, in particular, Dr Alan Crowden of Chapman and Hall for his support and encouragement.

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M. F. Goodman and E. W. Branscomb
(Chapter 8)

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J. Ninio
(Chapters 10 and 13)

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