
Preface

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THE OBJECTIVE OF THIS BOOK, like its precursors *Translational Control* (1996) and *Translational Control of Gene Expression* (2000), is to provide a comprehensive, up-to-date, and readable survey of the translational control field. The field is broad and expanding rapidly in all directions. Yet the publishers were at pains to impress upon us the need to keep the book within reasonable bounds—a precept that was easy to accept in principle but much thornier in practice. How to resolve the quandary? We decided that the book would embrace three themes.

As unabashedly conveyed by the title *Translational Control in Biology and Medicine*, the first theme emphasizes the engagement of this discipline in systems and processes at the cutting edge of biomedical research. Several chapters in the book discuss the impact that has been made on long-standing problems in diverse areas. These include learning and memory, embryonic development, and human diseases such as cancer, diabetes, and obesity, and disorders due to mitochondrial dysfunction or viral infection. Numerous antibiotics and toxins are known to target the translation system, and research and development efforts are under way to discover new drugs for further therapeutic uses. In one sense, this theme represents the fruits of efforts to apply the understanding of basic scientific principles to practical matters (aptly named translational research!); in another, it reflects a natural maturation of research into the mechanism and control of protein synthesis from some of its historical roots.

The second theme explores fundamental mechanisms and processes related to protein synthesis. Central to all progress in the field is our deepening appreciation of the translation system itself, as manifested vividly on the front cover of the book. Ribosome structures are revealing its actions and interactions in ever-increasing detail. Chapters in the book review this area, the mechanisms of protein synthesis, the structure and functions of translation factors, and the dynamic interplay among components of the translation system. Other chapters are devoted to cellular

mechanisms such as apoptosis, signal transduction, and mRNA turnover, which have intimate relationships with the translation system. The field of translational control both benefits from and furthers our understanding of these critical physiological processes.

Last, but not least, our third theme encompasses some new, under-represented and fast-growing areas. Topics accommodated in this motley category include cellular IRESs, microRNAs, mRNA localization, plants, and ribosome biogenesis. Many of these topics have seen rapid advances in the last few years, and this book provides a comprehensive overview of the regulation of gene expression across the biosphere. Of course, readers with access to previous monographs in this series can have some fun checking our success in spotting trends in the field.

While it is aimed to meet the expectations of the discriminating specialist, the book is intended to provide the newcomer with a readily intelligible entrée to the field. All of the chapters are completely new or have been extensively rewritten and updated by their authors, many of whom are themselves contributing for the first time. Most chapters do not have direct counterparts in previous monographs; those that do are radically changed in scope and emphasis, and even the introductory chapter on the origins and principles of translational control has been revised and expanded. Given the eclectic nature of the topics covered, we doubt that many will choose to read this volume from cover to cover, and certainly not in sequence, but we are confident that there is much to be gained from at least dipping into each chapter.

We are indebted to all of the authors, who have striven to write chapters that are stimulating, edifying, and authoritative. Without their expertise, there would be no book. At the Cold Spring Harbor Laboratory Press, thanks go to John Inglis who conceived the idea for the original monograph, to Alex Gann, Denise Weiss, Pat Barker, and Jan Argentine for their help and encouragement with this volume, and especially to Joan Ebert, who kept the project moving with skill and good humor. Finally, we are grateful to Marvin Wickens (University of Wisconsin) for cover art suggestions, to Harry Noller (University of California, Santa Cruz) and Paul De Koninck (Université Laval) for images, and to Cheyenne Moorman (New Jersey Medical School) for compiling the montage.

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