

PREFACE

The fourth edition of *Eukaryotic Transcription Factors* differed radically from its predecessors in the manner in which the immense amount of information about transcription factors was organized. Thus, for the first time, the book adopted a single approach of dealing in turn with the specific properties of transcription factors, using a range of examples. This contrasted with the dual approach of previous editions in which the roles of individual transcription factors were discussed in the initial chapters, followed by chapters on the more mechanistic aspects of their function.

This single approach has proved successful and is therefore continued in this new edition. However, as in all previous editions, the immense amount of progress that has been made since the publication of the fourth edition has necessitated updating throughout the volume.

The most important changes, however, reflect a fundamental change in our view of transcription factor function, which has taken place progressively over a number of years since the initial editions of this book were published. Thus, for a considerable period it was believed that transcription factors acted primarily at the level of transcriptional initiation by interacting directly or indirectly with the basal transcriptional complex to enhance or reduce its activity. This clearly remains a central function of transcription factors. However, it is now clear that transcription factors also play a key role both before and after the process of transcriptional initiation by the basal transcriptional complex.

In particular, transcription factors have a vital role in organizing the chromatin structure of a particular gene so that it is either in an open chromatin structure compatible with transcription or in a more tightly packed closed chromatin structure that does not allow transcription to occur. The basic processes that modify chromatin structure and the key role of histone modifications in this effect now merit a more extensive discussion in Chapter 1 (section 1.2). Moreover, the effect of transcriptional activators on chromatin structure now merits a separate section of Chapter 5 (section 5.5), and similarly, the effect of transcriptional repressors on such chromatin structure is also now discussed in a separate section of Chapter 6 (section 6.4). This new section also includes

a subsection on the important topic of small inhibitory RNAs since, although these inhibitory molecules act mainly at stages subsequent to transcription, they can also modulate transcription by regulating chromatin structure (section 6.4.2).

As well as having an effect on chromatin structure prior to transcriptional initiation, transcription factors can also affect the process of transcriptional elongation that occurs subsequent to transcriptional initiation. For this reason, Chapter 3 now contains a new section dealing with the basic process of transcriptional elongation, whilst Chapters 5 and 6 now contain additional sections that deal respectively with the effect on transcriptional elongation of activating (section 5.6) and inhibitory (section 6.5) transcription factors.

The significant advances that have been made in understanding the manner in which transcription factors regulate gene expression have been paralleled by an enhanced understanding of the manner in which these processes can go wrong to produce human disease. As more and more information on this topic accumulates, it becomes increasingly clear that transcription factors are important targets for therapies aimed at treating a wide range of human diseases. Accordingly, a new section has been added to Chapter 9 dealing specifically with the topic of transcription factors and the treatment of human disease (section 9.5).

It is hoped that these changes will allow the book to continue to provide an effective guide to the enormous complexity of transcription factors and the manner in which a relatively small number of factors control highly complex processes, such as embryonic development and functioning of the adult organism.

Finally, I would like to thank Miss Maruschka Malacos for her continued efficiency in typing the additional text and making the very large number of modifications to the existing text, which were required to keep the work up-to-date. I am also most grateful to Dr Luna Han and the staff of Elsevier for commissioning this new edition of the book and for the efficient manner in which they have produced it.

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