

Preface

Transcription factors (TFs) are central regulators of gene expression and, as such, modulate essential aspects of organismal function, including cell differentiation, tissue and organ development, responses to hormones and environmental factors, metabolic networks, and disease resistance, among others. Intrinsic to TF action is their capacity to specifically interact with DNA sequences and with other proteins as part of transcriptional complexes involved in the regulation of gene expression. Accordingly, knowledge of the structure of TFs and of the molecular mechanisms involved in the establishment of these interactions is essential to understand TF action. Plants contain a vast number of TFs (about 10% of plant genes encode TFs) that were acquired at different stages of evolution and were adapted to perform specific functions.

This book is intended as a source of information for those interested in the study of plant TFs and the many processes they regulate. It contains basic information that can be useful to students and researchers entering the field as well as more specific chapters devoted to plant TF families. These specific chapters do not constitute a comprehensive list of what is known about the different TF families but are rather examples of how the study of the different aspects of a specific TF family can be useful to establish the molecular aspects of TF function. Section A deals with general aspects of plant TFs. It contains two introductory chapters that describe the basics of TF action and methods usually employed to study TFs, followed by chapters that discuss structural and evolutionary aspects of plant TF families and plant-specific TF DNA-binding domains. Sections B and C present information about the structure, evolution, and functional aspects of several plant TF families, with examples of families that arose at

different stages of organismal evolution and were adapted to modulate specific aspects of plant developmental programs and responses. Finally, Section D contains chapters that discuss aspects of the posttranslational regulation of plant TF action by either intra- or intercellular movement, proteolytic processing, ubiquitination, or redox interconversions. The book is centered on TFs rather than on processes, understanding that there are excellent books that already describe plant regulatory networks and the TFs involved. These books, however, often describe interactions established by TFs in regulatory networks but do not deepen into the structural aspects of the TFs involved. I hope that through this book readers will acquire a general view of different aspects of plant TFs that eventually will help to fill the gap existing between the knowledge of the participation of a TF in a defined process and the establishment of the structural properties related to TF functions. In other words, to establish structural-functional relationships that explain in detail the molecular mechanisms involved in TF action.

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