

METHODS IN MOLECULAR BIOLOGY™

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Plant Developmental Biology

Methods and Protocols

Edited by

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and

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Preface

Plants come in myriads of shapes and colors, and the beauty of plants has fascinated mankind for thousands of years. Long before Mendel discovered the laws of heritability and Darwin developed his theory on evolution, the affection for ornamental plants led people to select alleles that establish novel plant forms. Today, plant developmental biology tries to discover the mechanisms that control the establishment of specialized cell types, tissues, and organs from the fertilized egg during a plant's life. Although the underlying processes of cell proliferation and differentiation are similar in plants and animals, plants are different because their development is usually open, and its outcome is not the faithful repetition of a general plan but is strongly influenced by environmental conditions. In the last few decades, plant developmental biology has pinpointed a large number of developmental regulators and their interactions and the mechanisms that govern plant development start to emerge. In part, this progress was enabled by the advance of powerful molecular tools for a few model species, most importantly *Arabidopsis*.

This volume of the *Methods in Molecular Biology* series provides a collection of protocols for many of the common experimental approaches in plant developmental biology. All chapters are written in the same format as that used in the *Methods in Molecular Biology*TM series. Each chapter opens with a description of the basic theory behind the method being described. The Materials section lists all the chemicals, reagents, buffers, and other materials necessary for carrying out the protocol. Since the principal goal of the book is to provide experimentalists with a full account of the practical steps necessary for carrying out each protocol successfully, the Methods section contains detailed step-by-step descriptions of every protocol that should result in the successful completion of each method. The Notes section complements the Methods material by indicating how best to deal with any problem or difficulty that might arise when using a given technique. Reflecting the current balance in the field, the book is most detailed for *Arabidopsis* but includes also protocols for other model species such as rice, maize, or Medicago. The book is divided into six major parts: growth protocols, manipulation of gene activity, assaying developmental phenotypes, assaying gene activity, testing protein–protein interactions, and probing chromatin. Presented methods are diverse and range from grafting over bimolecular fluorescence complementation to chromatin immunoprecipitation. In the first place, the book addresses a target audience of plant developmental geneticists and biochemists. In addition, colleagues from other fields such as stress physiology or plant nutrition will find this book helpful. Developmental biology was usually not the prime interest of these colleagues, but when analyzing mutants, which are nowadays so easily available using reverse genetics, many researchers will suddenly be confronted with phenotypes of abnormal development. Together, we hope that this volume will be an essential part of many laboratory libraries. We would be pleased if the book will be found more often on the bench top than in the book shelf.

L. Hennig
C. Köhler

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