

METHODS IN MOLECULAR BIOLOGY

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Plant Hormones

Methods and Protocols

Third Edition

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Preface

The field of Plant Hormone Biology is currently advancing at a rapid pace. In little more than a decade we have seen an impressive development that both broadened and deepened our knowledge of how small molecules influence plant physiology and development. Besides the classical hormones, we are now aware of novel compounds that exert hormonal functions, such as strigolactones, karrikins, or signaling peptides, where molecular signaling pathways still unfold. At the same time the understanding of other hormonal pathways has become so detailed that more and more sophisticated questions can be asked. Interactions between members of signaling networks even at the quantitative level, cross-talk between different hormonal pathways, or detailed molecular analyses of activity are now all within the reach of the experimenter.

In this book, we aim to present a representative cross section of modern experimental approaches relevant to Plant Hormone Biology. They range from relatively simple physiological assays, which can be performed in any laboratory with standard equipment, to highly sophisticated methods, which require specialized instrumentation. Some of the chapters describe novel, previously undescribed methods, while others are refined variations of existing protocols. The first four chapters are dedicated to physiological and developmental assays. In line with the increasing demand for high-throughput methods, three chapters on automated phenotyping follow. We tried to cover the wide spectrum of microscopy-based techniques with six chapters ranging from response quantification to four-dimensional tissue reconstruction. Mechanistic insight into hormonal pathways can be gained by interaction studies, and four chapters outline different experimental approaches. Traditionally, the plant hormone field has developed numerous analytical methods to measure hormone contents, and we feature four examples of recent developments. Finally, we conclude with two chapters which outline how the use of heterologous systems can significantly advance the field.

We trust the reader finds this book useful in a twofold way: On the one hand, it can be used as a cookbook, which quickly aids in the setup of a particular experiment directly relevant to the researcher's interest. On the other hand, we encourage the reader to browse through the chapters and explore whether some of the methods may be adapted also for their own research.

We wish our readers the best of luck for their experiments!

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