

METHODS IN MOLECULAR BIOLOGY™

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Rice Protocols

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Preface

Rice, *Oryza sativa*, is one of the most universal food crops for over half of the world's population. It also serves as an excellent model for monocots and economically important cereal crops because of its small genome, extensive genetic resources, relative ease of transformation, and synteny with other cereal genomes. With the completion of a finished genome sequence, increasing efforts have now focused on functional characterization of rice genes, elucidation of the underlying mechanisms involved in major agronomic traits (e.g., high yield, grain quality, abiotic stress tolerance, and disease resistance), and subsequent translation of genomic knowledge into agricultural productivity via molecular breeding and improved cultural practice.

To meet increasing interest in this field, *Rice Protocols* has been compiled to provide a series of core techniques and approaches commonly used in studying rice molecular biology and functional genomics. These include genetic and molecular techniques such as artificial hybridization, fluorescence in situ hybridization, generation and characterization of chemical and T-DNA insertional mutants, quantitative trait loci (QTLs) analysis and map-based cloning, site-specific transgene integration, and artificial microRNA-mediated gene silencing. A number of "omics" techniques have been described to facilitate transcriptome and small RNA profiling, protein identification, and metabolic analysis. In addition, several phenotypic, physiological, and cytological methods have been included for the study of root hair morphology and the evaluation of abiotic and biotic stress responses. The reviews in the book discuss molecular strategies for genetically engineering abiotic stress tolerance, disease resistance, and pharmaceutical production in rice, while the appendix provides many Internet resources related to rice genetic and genomic research. I hope this book is useful for both beginners and experienced researchers, whether they are molecular biologists who want to study rice plants or rice researchers who are interested in learning molecular techniques.

University Park, PA, USA

Yinong Yang

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