

METHODS IN MOLECULAR BIOLOGY

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Plant Argonaute Proteins

Methods and Protocols

Edited by

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 **Humana Press**

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ISSN 1064-3745

ISSN 1940-6029 (electronic)

Methods in Molecular Biology

DOI 10.1007/978-1-4939-7165-7

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Printed on acid-free paper

This Humana Press imprint is published by Springer Nature

The registered company is Springer Science+Business Media LLC

The registered company address is: 233 Spring Street, New York, NY 10013, U.S.A.

Preface

Since the discovery almost two decades ago of gene silencing phenomena related to RNA interference (RNAi), intensive research has highlighted the importance of ARGONAUTE (AGO) proteins as central effectors of RNAi pathways. In eukaryotes, AGOs associate with small RNAs (sRNAs) to direct gene silencing and regulate key biological processes such as development, response to stress, epigenetics, and antiviral defense. In plants, *Arabidopsis thaliana* has been a particularly valuable model organism to study AGO roles because of the functional diversification of the ten AGOs encoded in its genome, among other reasons. During the last years, the main molecular and biological functions of plant AGOs have been characterized. However, as occurred in human and insects, it is possible that new functions will be discovered soon for plant AGOs.

The purpose of this book is to provide the reader with step-by-step methods to study plant AGO functions. After an introductory review chapter (Chapter 1), the book summarizes the main biochemical methods to study AGO-sRNA complexes (Chapters 2–5) and their interaction with target RNAs (Chapters 6–7), AGO subcellular localization (Chapter 8), AGO association with polysomes (Chapter 9), and AGO role in meiosis and DNA repair (Chapter 10). Next, methods for the identification, cloning, and characterization of AGO genes in different plant species are presented (Chapters 11–13), as well as nonradioactive protocols for sRNA detection (Chapters 14–15). Finally, a series of chapters describing computational methods to study plant AGO function and evolution are provided (Chapters 16–20).

My motivation to edit this *Methods in Molecular Biology* volume was to provide the most complete and updated list of protocols to study plant AGO function. Unfortunately, it has not been possible to cover all the contributions of plant AGOs nor to avoid some overlaps between chapters. Therefore, I deeply apologize to those readers who may regret such omissions or redundancies.

I am especially thankful to Prof. Jim Carrington for giving me the opportunity to study the biological roles of plant AGOs during my postdoc in his lab these last years. I would also like to thank all authors of the chapters for their effort and commitment to the project and for providing such high-quality manuscripts. Finally, I am also thankful to the series editor Prof. John Walker and the Springer staff for their support, help, and guidance.

Valencia, Spain

Alberto Carbonell

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Methods and Protocols

Carbonell, A. (Ed.)

2017, XI, 297 p. 47 illus., 27 illus. in color., Hardcover

ISBN: 978-1-4939-7164-0

A product of Humana Press