

METHODS IN MOLECULAR BIOLOGY

Series Editor
John M. Walker
School of Life and Medical Sciences
University of Hertfordshire
Hatfield, Hertfordshire, AL10 9AB, UK

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Plant Argonaute Proteins

Methods and Protocols

Edited by

Alberto Carbonell

Instituto de Biología Molecular y Celular de Plantas (Consejo Superior de Investigaciones Científicas—Universidad Politécnica de Valencia), Valencia, Spain

 Humana Press

Editor

Alberto Carbonell
Instituto de Biología Molecular y Celular de Plantas
(Consejo Superior de Investigaciones Científicas–Universidad Politécnica de Valencia)
Valencia, Spain

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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Contributors

- IVETT BAKSA • *National Agricultural Research and Innovation Centre, Agricultural Biotechnology Institute, Epigenetics Group, Gödöllő, Hungary*
- JÓZSEF BURGÁN • *Agricultural Biotechnology Institute, National Agricultural Research and Innovation Centre, Gödöllő, Hungary*
- DAMIAN A. CAMBIAGNO • *Instituto de Agrobiotecnología del Litoral (UNL–CONICET–FBCB), Santa Fe, Argentina*
- ALBERTO CARBONELL • *Instituto de Biología Molecular y Celular de Plantas (Consejo Superior de Investigaciones Científicas–Universidad Politécnica de Valencia), Valencia, Spain*
- YUXING DENG • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- CHENG-GUO DUAN • *Shanghai Center for Plant Stress Biology and Center of Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, Shanghai, China; Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN, USA*
- KÁROLY FÁTYOL • *Agricultural Biotechnology Institute, National Agricultural Research and Innovation Centre, Gödöllő, Hungary*
- FILIPP FRANK • *Department of Biochemistry, Emory University, Atlanta, GA, USA; Department of Chemistry, Emory University, Atlanta, GA, USA*
- DELFINA GAGLIARDI • *Instituto de Agrobiotecnología del Litoral (UNL–CONICET–FBCB), Santa Fe, Argentina*
- JUN HU • *State Key Laboratory for Hybrid Rice, College of Life Sciences, Wuhan University, Hubei, China*
- TAICHIRO IKI • *Graduate School of Frontier Biosciences, Osaka University, Osaka, Japan*
- MASAYUKI ISHIKAWA • *Division of Plant and Microbial Sciences, Institute of Agrobiological Sciences, National Agriculture and Food Research Organization, Tsukuba, Ibaraki, Japan*
- HIRO-OKI IWAKAWA • *Institute of Molecular and Cellular Biosciences, The University of Tokyo, Bunkyo-ku, Tokyo, Japan; Department of Computational Biology and Medical Sciences, Graduate School of Frontier Sciences, The University of Tokyo, Tokyo, Japan*
- WOJCIECH M. KARLOWSKI • *Department of Computational Biology, Institute of Molecular Biology and Biotechnology, Faculty of Biology, Adam Mickiewicz University, Poznan, Poland*
- ELODIE LANET • *Laboratoire de Génétique et Biophysique des Plantes, Aix Marseille Univ, Marseille, France; CNRS, UMR 7265 Biologie Végétale et Microbiologie Environnementale, Marseille, France; CEA, BIAM, Marseille, France*
- CÉCILE LECAMPION • *Laboratoire de Génétique et Biophysique des Plantes, Aix Marseille Univ, Marseille, France; CNRS, UMR 7265 Biologie Végétale et Microbiologie Environnementale, Marseille, France; CEA, BIAM, Marseille, France*
- CAILI LI • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- ZHENG GUO LI • *School of Life Sciences, Chongqing University, Chongqing, China*

- MIAOMIAO LIU • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- SHANFA LU • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- PABLO A. MANAVELLA • *Instituto de Agrobiotecnología del Litoral (UNL–CONICET–FBCB), Santa Fe, Argentina*
- MARINA MARTINEZ-GARCIA • *School of Biosciences, University of Birmingham, Birmingham, UK*
- REBECCA A. MOSHER • *School of Plant Sciences, The University of Arizona, Tucson, AZ, USA*
- BHUSHAN NAGAR • *Department of Biochemistry and Groupe de Recherche Axé sur la Structure des Protéines, McGill University, Montreal, QC, Canada*
- SHREE P. PANDEY • *Department of Biological Sciences, Indian Institute of Science Education and Research Kolkata, Nadia, West Bengal, India*
- YONGQI PANG • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- MÓNICA PRADILLO • *Departamento de Genética, Facultad de Biología, Universidad Complutense de Madrid, Madrid, Spain*
- GUODONG REN • *State Key Laboratory of Genetic Engineering and Collaborative Innovation Center for Genetics and Development, School of Life Sciences, Fudan University, Shanghai, China*
- CHRISTOPHE ROBAGLIA • *Laboratoire de Génétique et Biophysique des Plantes, Aix Marseille Univ, Marseille, France; CNRS, UMR 7265 Biologie Végétale et Microbiologie Environnementale, Marseille, France; CEA, BIAM, Marseille, France*
- FENJUAN SHAO • *State Key Laboratory of Tree Genetics and Breeding, Research Institute of Forestry, Chinese Academy of Forestry, Beijing, China*
- RAVI K. SINGH • *Department of Biological Sciences, Indian Institute of Science Education and Research Kolkata, Nadia, West Bengal, India*
- GYÖRGY SZITTYA • *National Agricultural Research and Innovation Centre, Agricultural Biotechnology Institute, Epigenetics Group, Gödöllő, Hungary*
- KAI TANG • *Shanghai Center for Plant Stress Biology and Center of Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, Shanghai, China; Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN, USA*
- YUKIHIDE TOMARI • *Institute of Molecular and Cellular Biosciences, The University of Tokyo, Bunkyo-ku, Tokyo, Japan; Department of Computational Biology and Medical Sciences, Graduate School of Frontier Sciences, The University of Tokyo, Tokyo, Japan*
- ARIEL H. TOMASSI • *Instituto de Agrobiotecnología del Litoral (UNL–CONICET–FBCB), Santa Fe, Argentina*
- JOSHUA T. TRUJILLO • *Biochemistry, Molecular and Cellular Biology Program, The University of Arizona, Tucson, AZ, USA*
- MEIZHEN WANG • *Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China*
- XIAOYAN WANG • *State Key Laboratory of Genetic Engineering and Collaborative Innovation Center for Genetics and Development, School of Life Sciences, Fudan University, Shanghai, China*
- ZHIQIANG XIAN • *School of Life Sciences, Chongqing University, Chongqing, China*
- TOMOHITO YAMASAKI • *Science Department, Natural Science Cluster, Kochi University, Kochi, Japan*
- FANG YAN • *School of Life Sciences, Chongqing University, Chongqing, China*

- MANABU YOSHIKAWA • *Division of Plant and Microbial Sciences, Institute of Agrobiological Sciences, National Agriculture and Food Research Organization, Tsukuba, Ibaraki, Japan*
- BIN YU • *Center for Plant Science Innovation and School of Biological Sciences, University of Nebraska–Lincoln, Lincoln, NE, USA*
- HUIMING ZHANG • *Shanghai Center for Plant Stress Biology and Center of Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, Shanghai, China*
- JIAN-KANG ZHU • *Shanghai Center for Plant Stress Biology and Center of Excellence in Molecular Plant Sciences, Chinese Academy of Sciences, Shanghai, China; Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN, USA*
- YINGGUO ZHU • *State Key Laboratory for Hybrid Rice, College of Life Sciences, Wuhan University, Hubei, China*
- ANDRZEJ ZIELEZINSKI • *Department of Computational Biology, Institute of Molecular Biology and Biotechnology, Faculty of Biology, Adam Mickiewicz University, Poznan, Poland*



<http://www.springer.com/978-1-4939-7164-0>

Plant Argonaute Proteins

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