

PLANT CELL MONOGRAPHS

T. Munnik
Editor

Lipid Signaling in Plants



Springer

Contents

Part I Phospholipases

Phospholipase A in Plant Signal Transduction	3
Günther F.E. Scherer	

The Emerging Roles of Phospholipase C in Plant Growth and Development	23
Peter E. Dowd and Simon Gilroy	

Plant Phospholipase D	39
Wenhua Zhang, Xiaobo Wan, Yueyun Hong, Weiqi Li, and Xuemin Wang	

Part II Kinases

Phosphatidylinositol 4-Phosphate is Required for Tip Growth in <i>Arabidopsis thaliana</i>	65
Amy L. Szumlanski and Erik Nielsen	

PIP-Kinases as Key Regulators of Plant Function	79
Till Ischebeck and Ingo Heilmann	

Plant Phosphatidylinositol 3-Kinase	95
Yuree Lee, Teun Munnik, and Youngsook Lee	

Diacylglycerol Kinase	107
Steven A. Arisz and Teun Munnik	

Part III Phosphatases

Signaling and the Polyphosphoinositide Phosphatases from Plants	117
Glenda E. Gillaspay	

Phosphatidic Acid Phosphatases in Seed Plants	131
Yuki Nakamura and Hiroyuki Ohta	

Part IV PPI Metabolism

InsP₃ in Plant Cells	145
Yang Ju Im, Brian Q. Phillippy, and Imara Y. Perera	

Inositol Polyphosphates and Kinases	161
Jill Stevenson-Paulik and Brian Q. Phillippy	

Phosphoinositides and Plant Cell Wall Synthesis	175
Ruiqin Zhong, Ryan L. McCarthy, and Zheng-Hua Ye	

Imaging Lipids in Living Plants	185
Joop E.M. Vermeer and Teun Munnik	

Part V PA Signaling

Phosphatidic Acid: An Electrostatic/Hydrogen-Bond Switch?	203
Edgar Eduard Kooijman and Christa Testerink	

Nitric Oxide and Phosphatidic Acid Signaling in Plants	223
Ayelen M. Distéfano, M. Luciana Lanteri, Arjen ten Have, Carlos García-Mata, Lorenzo Lamattina, and Ana M. Laxalt	

3-Phosphoinositide-Dependent Protein Kinase is a Switchboard from Signaling Lipids to Protein Phosphorylation Cascades	243
Christine Zalejski and László Bögre	

Part VI Additional Lipid Signals

Diacylglycerol Pyrophosphate, A Novel Plant Signaling Lipid	263
Emmanuelle Jeannette, Sophie Paradis, and Christine Zalejski	

Oxylipin Signaling and Plant Growth	277
Alina Mosblech, Ivo Feussner, and Ingo Heilmann	

Fatty Acid Amide Hydrolase and the Metabolism of <i>N</i>-Acylethanolamine Lipid Mediators in Plants	293
Kent D. Chapman and Elison B. Blancaflor	
Sphingolipid Signaling in Plants	307
Louise V. Michaelson and Johnathan A. Napier	
Index	323