CONTENTS

Contributors vii

Effects of High Hydrostatic Pressures on Living Cells: A Consequence of the Properties of Macromolecules and Macromolecule-Associated Water

Pascale Mentré and Gaston Hui Bon Hoa

I. Introduction 1
II. Cell-Associated Water and Pressure 3
III. Effects of High Hydrostatic Pressures on Biological Macromolecules 21
IV. Effects of High Hydrostatic Pressures on Molecule Assemblages and Isolated Cell Organelles 31
V. Effects of High Hydrostatic Pressures on Living Cells 43
VI. Concluding Remarks 67
References 69

Role of Ca^{2+} in Membrane Excitation and Cell Motility in Characean Cells as a Model System

Munehiro Kikuyama

I. Introduction 85
II. Characeae Cells as a Material for Studying Calcium Signaling 86
III. Membrane Phenomena in Relation to Calcium Regulation 99
IV. Hydration-Induced Ca^{2+} Release (HICR) and Cytoplasmic Streaming 105
V. Concluding Remarks 109
References 110

Calcium in Ciliated Protozoa: Sources, Regulation, and Calcium-Regulated Cell Functions

Helmut Plattner and Norbert Klauke

I. Introduction 115
II. General Overview of Ca^{2+} Regulation in Eukaryotic Cells 117
III. Ca^{2+} in Ciliated Protozoa 125
IV. Concluding Remarks—Outlook on Open Questions for Future Research 184
References 186

Mitogen-Activated Protein (MAP) Kinase Pathways in Plants: Versatile Signaling Tools

Wilco Ligterink and Heribert Hirt

I. Introduction 209
II. Structure of Mitogen-Activated Protein Kinase (MAPK) Cascades 211
III. MAPK Pathways in Eukaryotes 215
IV. MAPK Cascades in Plants: Structure and Phylogenetic Classification 219
V. Functions of MAPK Pathways in Plants 230
VI. MAPK Pathway Inactivation 255
VII. Concluding Remarks and Perspectives 257
References 258

Index 277