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(Eds.)

# Plasmodesmata

Structure, Function,  
Role in  
Cell Communication



Springer

# Plasmodesmata Structure Function Role In Cell Communication

**Katarzyna Sokołowska, Paweł Sowiński**

## **Plasmodesmata Structure Function Role In Cell Communication:**

Plasmodesmata Aart J.E. van Bel, Wilhelmus J.P. van Kesteren, 2012-12-06 Plasmodesmata are minuscule plasma corridors between plant cells which are of paramount importance for transport communication and signalling between cells These nano channels are responsible for the integrated action of cells within tissues and for the subdivision of the plant body into working symplast units This book updates the wealth of new information in this rapidly expanding field Reputed workers in the field discuss major techniques in plasmodesmatal research and describe recent discoveries on the ultrastructure the functioning and the role of plasmodesmata in intracellular transport and communication in cell differentiation plant development and virus translocation

Intercellular Communication in Plants Andrew J. Fleming, 2005 Intercellular Communication in Plants provides an overview of intercellular signaling systems capitalizing on the results of contemporary molecular biology Many biological phenomena are controlled by intercellular signaling systems initiated by messenger molecules For example intercellular communication channels are thought to be associated with a plant's growth and dormancy development an important adaptive strategy for the survival and regrowth of temperate perennials This volume is directed at researchers and professionals in plant biochemistry physiology cell biology and molecular biology in both the academic and industrial sectors

Cell-Cell Channels František Baluška, Dieter Volkmann, Peter W. Barlow, 2007-08-10 The biological sciences are dominated by the idea that cells are the functionally autonomous physically separated discrete units of life This concept was propounded in the 19th century by discoveries of the cellular structuring of both plants and animals Moreover the apparent autonomy of unicellular eukaryotes as well as the cellular basis of the mammalian brain an organ whose anatomy for a long while defied attempts to validate the idea of the cellular nature of its neurons seemed to provide the final conclusive evidence for the completeness of cell theory a theory which has persisted in an almost dogmatic form up to the present day However it is very obvious that there are numerous observations which indicate that it is not the cells which serve as the basic units of biological life but that this property falls to some other subcellular assemblage To deal with this intricate problem concerning the fundamental unit of living matter we proposed the so called Cell Body concept which in fact develops an exceedingly original idea proposed by Julius Sachs at the end of the 19th century In the case of eukaryotic cells DNA enriched nuclei are intimately associated with a microtubular cytoskeleton In this configuration as a Cell Body these two items comprise the fundamental functional and structural unit of eukaryotic living matter The Cell Body seems to be inherent to all cells in all organisms

**Actin: A Dynamic Framework for Multiple Plant Cell Functions** Christopher J. Staiger, Frantisek Baluska, D. Volkmann, P. Barlow, 2013-04-17 Actin is an extremely abundant protein that comprises a dynamic polymeric network present in all eukaryotic cells known as the actin cytoskeleton The structure and function of the actin cytoskeleton which is modulated by a plethora of actin binding proteins performs a diverse range of cellular roles Well documented functions for actin include providing the molecular tracks for cytoplasmic streaming and organelle movements

formation of tethers that guide the cell plate to the division site during cytokinesis creation of honeycomb like arrays that enmesh and immobilize plastids in unique subcellular patterns supporting the vesicle traffic and cytoplasmic organization essential for the directional secretory mechanism that underpins tip growth of certain cells and coordinating the elaborate cytoplasmic responses to extra and intracellular signals The previous two decades have witnessed an immense accumulation of data relating to the cellular biochemical and molecular aspects of all these fundamental cellular processes This prompted the editors to put together a diverse collection of topics contributed by established international experts related to the plant actin cytoskeleton Because the actin cytoskeleton impinges on a multitude of processes critical for plant growth and development as well as for responses to the environment the book will be invaluable to any researcher from the advanced undergraduate to the senior investigator who is interested in these areas of plant cell biology

**Annual Plant Reviews, Plasmodesmata** Karl J. Oparka, 2008-04-15 Since their discovery over 100 years ago plasmodesmata have been the focus of intense investigation Plasmodesmata are unique to plants and form an intercellular continuum for the transport of solutes signals and ribonucleoprotein complexes It is now clear that plasmodesmata formation and regulation are central to a diverse range of plant functions that include developmental programming host pathogen interactions and systemic RNA signaling This book provides a state of the art overview of the diverse forms and functions of plasmodesmata It covers the structure and evolution of plasmodesmata their role in plant development and solute transport and their central function in systemic signaling via the phloem It includes critical evaluations of current methods used to study intercellular transport via plasmodesmata The volume is directed at researchers and professionals in plant cell biology plant molecular biology plant physiology and plant pathology

**Annual Plant Reviews, Intercellular Communication in Plants** Andrew J. Fleming, 2009-02-12 Annual Plant Reviews Volume 16 Intercellular communication in plants plays a vital role in the coordination of processes leading to the formation of a functional organism The signalling systems must function at a local level to coordinate events of cellular differentiation over long distances to coordinate developmental and physiological responses in different parts of the plant and they must even operate between separate individuals for example to control fertilization as part of the evolutionary strategy of a particular species To cope with the diverse requirements for intercellular signalling plants have evolved a spectrum of molecular mechanisms and significant progress has been made over the last few years in our understanding of these processes This volume provides an overview of our current understanding of intercellular communication in plants with an emphasis on those research areas showing significant recent progress and promise It is directed at researchers and professionals in plant biochemistry physiology cell biology and molecular biology

**Symplasmic Transport in Vascular Plants** Katarzyna Sokołowska, Paweł Sowiński, 2013-07-25 Concentrates on symplasmic transport of small molecules although the cell to cell transport of macromolecules will also be discussed This book characterizes the efficiency of symplasmic transport mechanisms of molecule passage via plasmodesmata and the

external and internal factors that regulate plasmodesmatal conductivity In this context the book focused on the role of symplasmic domains in plant development as well as the influence of environmental stresses on the plasmodesmata Besides cell to cell symplasmic transport the significance of long distance symplasmic transport of solutes in phloem elements is also reviewed Symplasmic Transport in Vascular Plants presents the mechanism of phloem transport the processes of symplasmic loading and unloading as well as the role of pre and post phloem transport with special attention paid to symplasmic transport in wood Finally the relevance of the spread of both macromolecules and viruses via plasmodesmata is presented

Adaptations and Responses of Woody Plants to Environmental Stresses Rajeev Arora,2004-08-27 Discover what improves stress resistance to cold in woody plants used in horticulture Adaptations and Responses of Woody Plants to Environmental Stresses covers the latest and most significant advances in woody plant stress research Few books focus on the low temperature stress biology of woody plants that are of horticultural importance Sugarcane Paul H. Moore,Frederik C. Botha,2013-12-06 Physiology of Sugarcane looks at the development of a suite of well established and developing biofuels derived from sugarcane and cane based co products such as bagasse Chapters provide broad ranging coverage of sugarcane biology biotechnological advances and breakthroughs in production and processing techniques This single volume resource brings together essential information to researchers and industry personnel interested in utilizing and developing new fuels and bioproducts derived from cane crops *Phloem* Gary A. Thompson,Aart J.E. van Bel,2012-08-13 Phloem Molecular Cell Biology Systemic Communication Biotic Interactions is a timely collection of research on the cellular and molecular biology of this plant vascular tissue Recent advances in phloem research have revealed the centrality of this plant tissue to whole plant development and physiology Building on advances made through developments of new analytical technologies this book will provide readers with a current and comprehensive reference on the role of phloem in plant growth and development Collecting the work of a global team of leading researchers Phloem will provide the reader with a valuable synthesis of the latest research in a single volume **Plant Cells and Tissues** Nicholas Stephens,2006 This title will describe the basic cell structure the cell cycle cell types and organization of functional tissue systems in plants **Short and Long Distance Signaling** Friedrich Kragler,Martin Hülskamp,2011-12-06 The ability of plants to exchange RNA molecules and transcription factors between cells and tissues is a relatively recent discovery However all areas of research such as plant development metabolism and plant pathogen interactions now realize the importance of this phenomenon In this book experts from the field of intercellular transport deal with various aspects on intercellular transport of viruses and plant endogenous macromolecules such as transcription factors small silencing induced and micro RNAs and other RNAs and their function as signals The aim of the book is to provide the basic information on the cell to cell transport mechanism and to give an overview of the current knowledge of this relatively new field of research To quote the words of W J Lucas pioneering discoveries in this field of cell to cell and long distance signaling should certainly entice talented young scholars to join this

frontier area of plant biology He is certainly right as we got only a first glimpse on the cellular factors regulating intercellular transport and the functional diversity of the ever increasing number of proteins and RNA molecules found to move between cells

**The Yeasts** Cletus Kurtzman, J.W. Fell, Teun Boekhout, 2011-05-09 The Yeasts A Taxonomic Study is a three volume book that covers the taxonomic aspect of yeasts The main goal of this book is to provide important information about the identification of yeasts It also discusses the growth tests that can be used to identify different species of yeasts and it examines how the more important species of yeasts provide information for the selection of species needed for biotechnology Volume 1 discusses the identification classification and importance of yeasts in the field of biotechnology Volume 2 focuses on the identification and classification of ascomycetous yeasts Volume 3 deals with the identification and classification of basidiomycetous yeasts along with the genus Prototheca High quality photomicrographs and line drawings Detailed phylogenetic trees Up to date clearly presented yeast taxonomy and systematic easy to use reference sequence accession numbers to allow for correct identification

*The Science of Horticulture Volume 02* K V Peter, 2011-01-01 The volume covers recent research materials from countries like India USA Japan European Union UK etc on vegetable Science Fruit Science Ornamentals Spices Plantation Crops and Postharvest Technology Contributed by the best teachers and scientists in the field The volumes expose the readers to the basics of Horticultural practices and phenomena with chapters on 1 Geographical Indications in horticulture by Elsy C R and Mridula N 2 Emerging trends in bioinformatics by Keshavachandran R Reena N and Nancy Thomas 3 Chemistry of Fragrance by Shamina Azeez 4 Advances in development of salt and water stress tolerant plants by Vanaja T 5 Physiology of dormancy by Passam Harold C and Alexopoulos Alexios A 6 Principles of preservation and packing to improve quality and extend shelf life of fresh horticultural produce by Bakshi A K and Aggarwal Poonam 7 Graft incompatibility by Masayo Kawaguchi David Backhouse Acram Taji and Masayuki Oda 8 Role and symptoms of deficiency of micronutrients in horticultural crops by Nirmala Devi S and Sadhan Kumar P G 9 History of bioinformatics by Keshavachandran R and Nancy Thomas 10 Entomology in India a historical perspective by Sosamma Jacob 11 Ecofriendly approaches for the management of pests and disease of horticultural crops by Nakkeeran S Renuka Devi P and Marimuthu T 12 HELLO priming in vegetable crops by Krishna Kumar K 13 Controlled atmosphere storage of fruits by Sudhakar Rao D V Gopalakrishna Rao K P and Narayana C K 14 Physiology of fruit ripening by Dhillon W S and Gill P P S 15 Trade in floriculture by Sheela Jayagopan

**Plant Cell Biology** Randy O. Wayne, 2018-11-13 Plant Cell Biology Second Edition From Astronomy to Zoology connects the fundamentals of plant anatomy plant physiology plant growth and development plant taxonomy plant biochemistry plant molecular biology and plant cell biology It covers all aspects of plant cell biology without emphasizing any one plant organelle molecule or technique Although most examples are biased towards plants basic similarities between all living eukaryotic cells animal and plant are recognized and used to best illustrate cell processes This is a must have reference for scientists with a background in plant anatomy plant physiology plant growth and development

plant taxonomy and more Includes chapter on using mutants and genetic approaches to plant cell biology research and a chapter on omic technologies Explains the physiological underpinnings of biological processes to bring original insights relating to plants Includes examples throughout from physics chemistry geology and biology to bring understanding on plant cell development growth chemistry and diseases Provides the essential tools for students to be able to evaluate and assess the mechanisms involved in cell growth chromosome motion membrane trafficking and energy exchange     The Plant Endoplasmic Reticulum David G. Robinson,2006-08-15 The endoplasmic reticulum ER called the mother of all membranes is spotlighted in this timely new book The work presented here is especially exciting since GFP technology has provided new ways of looking at the dynamics of the ER and its relationship to other organelles particularly the Golgi apparatus and peroxisomes This book provides in depth knowledge of the ER and the diverse roles it plays     **Plant Electrophysiology** Alexander G. Volkov,2012-05-03 This book written by the leading experts in the field of plant electrophysiology provides a comprehensive and up to date overview of the current state of knowledge on electrical signaling and responses in plant physiology It covers a significant interdisciplinary area for a broad range of researchers emphasizing the physical chemical biological and technological aspects of plant electrophysiology while also demonstrating the role of electrochemical processes and ion channels in plant life cycles Separate chapters describe the electrophysiology of the Venus flytrap the Telegraph plant Mimosa pudica and other interesting plant species Subsequent sections focus on mechanisms of plant movement the role of ion channels morphing structures and the effects of electrical signal transduction on photosynthesis and respiration Further topics include the electrophysiology of plant insect interactions how plants sense different environmental stresses and stimuli and how phytoactuators respond to them All chapters analyze the generation and transmission of electrical signals in plants     *International Review of Cytology* Kwang W. Jeon,2004-08-28 International Review of Cytology presents current advances and comprehensive reviews in cell biology both plant and animal Articles address structure and control of gene expression nucleocytoplasmic interactions control of cell development and differentiation and cell transformation and growth Authored by some of the foremost scientists in the field each volume provides up to date information and directions for future research     *Esau's Plant Anatomy* Ray F. Evert,2006-08-28 This revision of the now classic Plant Anatomy offers a completely updated review of the structure function and development of meristems cells and tissues of the plant body The text follows a logical structure based organization Beginning with a general overview chapters then cover the protoplast cell wall and meristems through to phloem periderm and secretory structures There are few more iconic texts in botany than Esau s Plant Anatomy this 3rd edition is a very worthy successor to previous editions ANNALS OF BOTANY June 2007     *Plant Virology* Roger Hull,2013-10-31 The seminal text Plant Virology is now in its fifth edition It has been 10 years since the publication of the fourth edition during which there has been an explosion of conceptual and factual advances The fifth edition of Plant Virology updates and revises many details of the previous edition

while retaining the important earlier results that constitute the field's conceptual foundation Revamped art along with fully updated references and increased focus on molecular biology transgenic resistance aphid transmission and new cutting edge topics bring the volume up to date and maintain its value as an essential reference for researchers and students in the field Thumbnail sketches of each genera and family groups Genome maps of all genera for which they are known Genetic engineered resistance strategies for virus disease control Latest understanding of virus interactions with plants including gene silencing Interactions between viruses and insect fungal and nematode vectors Contains over 300 full color illustrations



## Unveiling the Magic of Words: A Overview of "**Plasmodesmata Structure Function Role In Cell Communication**"

In some sort of defined by information and interconnectivity, the enchanting power of words has acquired unparalleled significance. Their ability to kindle emotions, provoke contemplation, and ignite transformative change is actually awe-inspiring. Enter the realm of "**Plasmodesmata Structure Function Role In Cell Communication**," a mesmerizing literary masterpiece penned by way of a distinguished author, guiding readers on a profound journey to unravel the secrets and potential hidden within every word. In this critique, we shall delve to the book is central themes, examine its distinctive writing style, and assess its profound impact on the souls of its readers.

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