

Preface

During the past 6 years plant endocytosis developed into a flourishing research field. The role of clathrin-mediated endocytosis in the internalization of some plasma membrane proteins was firmly established while alternative clathrin-independent endocytic routes such as fluid-phase and flotillin-dependent endocytosis were also described. Plant endosomes turned from enigmatic organelles to subcellular compartments with partially defined molecular topology and function. [Chapter 1](#) of this book provides an overview of diverse methods recently introduced into plant endocytosis research. Up-to-date methodological approaches such as proteomics and advanced microscopy including light sheet microscopy or fluorescence recovery after photobleaching (FRAP) combined with super resolution microscopy start to be applied in plant endocytic research. [Chapter 2](#) is devoted to chemical genomics, providing a new generation of more specific chemical inhibitors which in combination with automated quantitative microscopy (cellomics) provide another very powerful tool to study endocytosis in plants. [Chapters 3](#) and [4](#) are focused on the crucial role of endocytosis in the establishment and maintenance of polarity in diverse types of plant cells. [Chapter 5](#) describes fluid phase endocytosis in specialized storage plant cells while [Chap. 6](#) provides a very useful overview of physical factors which have some impact on endocytosis. The next three chapters are focused on plasma membrane proteins such as receptors, auxin transporters and water channels, nicely demonstrating biologically relevant roles of endocytosis in the regulation of signalling proteins as well as auxin and water transport in plant cells and tissues. [Chapters 10–14](#) deal with crucial molecular players regulating different steps of endocytosis, namely Rab GTPases, SNAREs, SCAMP, sorting nexins, retromer, and ESCRT proteins. The next two chapters summarize the importance of endocytosis in plant cell interaction with pathogens and symbiotic microbes. The final chapter provides an overview of the role of the cytoskeleton in the different types of endocytosis in plants and other organisms.

In total, the present book summarizes the latest advances in the field of plant endocytosis. Moreover, it also provides several excellent examples of biological relevance of endocytosis in physiological processes controlling cell polarity,

shape, water and nutrition uptake, or biotic interactions of plant cells with pathogens and symbionts. These surely belong to important fields of plant biology.

I would like to thank all authors for their excellent contributions to this book. I hope that reader will enjoy and appreciate it.

This book is dedicated to my family.

Olomouc, June 2012

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