

BOOK REVIEW

Plant Cell Compartments – Selected Topics. B. Schoefs (ed.) 2008. Research Signpost (Kerala, India). 215 USD (paperback) 450 pp. ISBN 978-81-308-0104-9

This book has 16 chapters closely or loosely related to each other, grouped into 6 parts. In this book review, each chapter has been treated individually in order to give an account of the content of the volume. The reviewer admits that his view and his emphases may be subjective.

Chapter 1 (»The nuclear pore complex: From higher eukaryotes to plants«, by S. M. Paulillo and B. Fahrenkrog) gives an up-to-date description of this structure and its molecular constituents. The authors avoid mentioning a transporter, rather they identify the central plug with a cargo in transit, an old idea re-proposed now on the basis of recent AFM and EM studies. Even so, how the targeted transport (import/export) actually happens still remains to be elucidated.

The next chapter (»Cell wall changes during strawberry fruit ripening«, by G. A. Martinez) describes an applied and rather specific study about the highly dynamic changes that plant cell walls can undergo during fruit maturation. The strawberry model is compared with other fruit types.

Semi-autonomous organelles are treated in the following six chapters from different points of view.

K. Rohacek et al. give a very comprehensive treaty under the title »Chlorophyll fluorescence: A wonderful tool to study plant physiology and plant stress«. Their review is a practical manual (or guidebook) including the basic principles, instrumental set-ups, experimental protocols and data analysis, closing with an overview of chlorophyll fluorescence imaging. This is followed by »Update in nucleotide dependent processes in plant chloroplasts« (C. Spetea and S. Thuswaldner), which extends to three classes of nucleotide binding proteins in the chloroplast: 1. ATP-binding transporters, 2. nucleotide diphosphate kinases, 3. GTP-binding proteins. These transporters play crucial roles in the regulation of photosynthesis.

In the next chapter (»Prolamellar body: A unique plastid compartment, which does not only occur in dark-grown leaves«) K. Solymosi and B. Schoefs primarily address the debated question of whether the greening of etioplasts can be considered a model of chloroplast development or whether it is an unnatural experimental system. They give numerous arguments about the occurrence of the etiolated state in certain stages of the development of different plant organs under totally natural conditions. This convincingly speaks in favour of the usefulness of the etiolated system. After this they thoroughly discuss the structure, the molecular composition and the development of prolamellar bodies. Writing their review, these authors traced their way back to the original articles describing the original concepts instead of referring only to recent literature data.

Subsequently a brief review is added (»Control of electron transfer reactions in photosynthetic reaction centers by dielectric permittivity: A quantitative description based on the Marcus theory«) by C. S. Chamorovsky et al. The correlation between the parameters mentioned in the title is interpreted by the distance dependence of the electron tunneling rate.

Then the reader can turn to »The uncoupling proteins of plant mitochondria: From gene expression patterns to putative activities« (by C. Hourton-Cabassa and F. Moreau), which is a pioneering assay on the plant homologues of thermogenic proteins in brown adipose tissue.

Mitochondria are treated from quite another point of view by I. Foisser under the title »Microfilaments, microtubules and mitochondria in characean internodal cells«. She points out that the two sets of these organelles (cortical and endoplasmic) move differently in elongating cells, and this seems to be influenced by the photosynthesis-based pH-bands in the cell.

The forthcoming three chapters are grouped under the main title »Impact of abiotic factors on organelles«. The first one deals with the »Cytoplasmic accumulation of astaxanthin by the green alga *Haematococcus pluvialis*« by Y. Lemoine et al., and reviews how environmental factors can trigger complete reorientation of the algal cell metabolism. The second one, entitled »Plastids and metals« by I. Poirier et al., compares the impacts of several heavy metals on the photosynthetic machinery. The third chapter, »Betalains: Vacuolar pigments« by H. El Gharras presents a review on the biochemistry of betalain pigments.

The next three chapters under the title »Impact of biotic factors on organelles« deal with mycorrhiza. The first (»Plastid reorganization in arbuscular mycorrhizal roots«, by T. Fester) gives an account of the proliferation of plastids and their increased biosynthetic capacity related to this symbiosis. The second (»Effect of mycorrhizal and biocontrol fungi on peroxidase activity of *Phoenix dactylifera* palms«, by L. Ben Khaled et al.) focuses on a specific consequence of fungal inoculation, while the third one (»Plasma membrane proteins in arbuscular mycorrhiza«, by G. Recorbet et al.) is more general, including data obtained by classical methods, transcriptomics and proteomics on the profound modifications that the plasma membrane surrounding the arbuscules can undergo upon cell colonization by an arbuscular mycorrhizal fungus.

The closing part (Special Topics) contains two chapters about organisms that do not belong to the plant kingdom, yet do have a compartment characteristic for plants, the vacuole (»Vacuole-like structures in prokaryotes – A personal account«, by H. Guo), or the plastid (apicoplast) in parasites (»Structure, function and biogenesis of the secondary plastid of apicomplexan parasites«, by C. Bisanz et al.).

Rather than offering a classical systematic coverage of plant cell compartments, this book includes chapters focused on emerging, debated, or new areas. In this way, the book is quite original and provides a lot of information not found in earlier books on plant cell biology.

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