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Bock, R.: **Cell and Molecular Biology of Plastids**. – Springer, Heidelberg 2007. ISBN 978-3-540-75375-9. 544 pp., 51 figs, 23 tabs. € 259.00, CHF 451.00, USD 339.00, GBP 199.00.

One year after publishing *The Structure and Function of Plastids* [R.R. Wise and J.K. Hoober (ed.)] in the *Advances in Photosynthesis and Respiration* series, Springer is issuing another monograph devoted to plastids, so one cannot avoid comparing them. The first question that emerges is whether there are enough subjects not covered in the first book to justify publication of the second one. Unambiguously, the answer is positive and there is surprisingly little overlap between the two books. On the other hand, this means that the reviewed book cannot be comprehensive as it leaves out some important subjects—such as plastid evolution.

As the title suggests, the emphasis of the book is on molecular aspects of plastid biology. The book begins with the least “molecular” chapter on plastid biogenesis and differentiation written by Kevin Pyke. The second chapter by Ralph Bock covers structure of plastid genomes in plants and algae. Important information here is that not all plants display a maternal mode of plastid inheritance. The following chapter, contributed by Anil Day and Panagiotis Madesis, addresses plastid DNA replication, recombination and repair with emphasis on homologous recombination. The next three chapters provide a detailed view of transcription and its regulation in plastids. The first of these, written by Karsten Liere and Thomas Börner, describes components of the transcriptional apparatus in plastids and their roles in transcription. The second one by David Stern and colleagues deals with transcript maturation and its polyadenylation-stimulated degradation. The role and probable evolutionary history of polyadenylation in plants, cyanobacteria, and chloroplast are also discussed. The third transcriptional chapter by Cristian Schmitz-Linneweber and Alice Barkan is devoted to mRNA intron splicing and editing, acquired traits rarely present in chloroplast bacterial ancestors. Logically, the following five chapters concern proteins. Although the translational mechanism of chloroplast mRNA is similar to that of bacteria, chloroplast ribosomes and translational factors are substantially different and many nuclear-encoded regulatory proteins allow sophisticated translational

regulation in response to changing environment, as discussed in the chapter by Hadas Peled-Zehavi and Avihai Danon. However, the majority of chloroplast proteins are nuclear encoded with N-terminal transit sequence and have to be imported into the plastid. The chapter by Birgit Agne and Felix Kessler summarizes the components of the translocation machinery, as well as new developments in the study of alternative import pathways. The assembly of protein complexes in the chloroplast is demonstrated on well-studied photosynthetic complexes by Eva-Mari Aro and her colleagues. The importance of orderly protein degradation in adaptation to changing environmental conditions in the chloroplast is stressed in the chapter written by Zach Adam. The chapter by Bianca Naumann and Michael Hippler gives an excellent overview of the current state of plastid proteomics from methodological approaches to the results of proteomic studies on individual chloroplast compartments. The amazing, quickly developing field of anterograde and retrograde signalling between nucleus and plastid and *vice versa* is summarized in the chapter by Thomas Pfannschmidt and colleagues. Great complexity of the regulatory pathways between prokaryotic and eukaryotic genomes of the plant cell is immediately apparent from their contribution. Lastly, a comprehensive and up-to-date chapter on genetic transformation of plastids written by Hans-Ulrich Koop and colleagues gives a great methodological overview of the available tools and approaches, including resistance markers for targeted gene inactivation and suitable promoters for inducible gene expression.

All in all, this volume gives an excellent overview of the progress and current status of molecular studies on plastids, particularly on chloroplast. The book is recommended for all plant molecular biologists, primarily for those working in plastid biology, photosynthesis, and biotechnology. A complete Table of contents of this book is available at: <http://www.springer.com/life+sci/cell+biology/book/978-3-540-75375-9?detailsPage=toc>.

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