Siegenthaler, P.-A., Murata, N. (ed.): **Lipids in Photosynthesis: Structure, Function and Genetics.** (Advances in Photosynthesis. Vol. 6.) - Kluwer Academic Publishers, Dordrecht - Boston - London 1998. 321 pp. NLG 265.00. ISBN 0-7923-5173-8.

This book belongs to the series of Advances in Photosynthesis that is edited by Govindjee. Significance of this book consists in connection of lipids as major component of chloroplast membrane with their importance for photosynthesis.

There are 15 comprehensive chapters. The first one introduces us to overview of structure and function of thylakoid lipids and their role in photosynthesis. The structures of major lipid are presented as well as the basic biosynthetic and degradation processes. Chapter 2 deals with the main constituent of thylakoids – glycerolipids and their structure, distribution and biosynthesis in higher plants. Next chapter is concentrated on algae, whose lipids were less studied than those of higher plants, algal specific lipids are stressed. Membrane lipids of cyanobacteria are discussed in chapter four. Cyanobacteria have special features convenient for compositional studies: they are naturally transformable as they easily take up exogenous DNA. Furthermore, they are sensitive to environment and alter their membrane lipids according to changes. Chapter 5 is devoted to membrane lipids in anoxygenic photosynthetic bacteria, which contain only one photosystem. Several novel lipids were discovered. It was found that growth conditions strongly influence the composition of bacterial membranes. The relation between physical properties of thylakoid membrane lipids and photosynthesis is the content of chapter 6. Here, three aspects are important, lipid phase transition with consequence to membrane phase separation, the lipid-protein interaction in structure and function of main thylakoid complexes, and the membrane fluidity as a factor limiting rates of electron transport. Chapter 7 deals with membrane acyl lipids in thylakoids of higher plants with stress to their molecular organisation in membranes. In order to avoid uncontrollable action of detergents, new tool for controlled lipid depletion of thylakoid membranes was introduced, *i.e.* cyclodextrins. Also new results on lipid transport to chloroplasts are presented, the mechanism involves transient fusion between inner envelope and thylakoids. Chloroplast envelope is supposed to play a key role in achievement of thylakoid lipid asymmetry. Further, in chapter 8 the role of acyl lipids in the function of photosynthetic membranes in higher plants is elucidated. Investigation of acyl lipid physicochemical characteristics and their topology in membrane leads to conclusion that specific functions and distinct domains of acyl lipids occur in thylakoid. For optimal photochemical activities, membrane fluidity is decisive. Moreover, this fluidity seems to be a signal in temperature perception. Lipids mediate proper conformation and orientation of membrane proteins. They are also involved in the action of herbicides. Chapter 9 summarises reconstitution of photosynthetic structures and activities with lipids. The role of phosphatidylglycerol in trimerization of LHC 2 complex was proved. It even induces formation of grana stacks. Lipid-protein interactions in chloroplast protein import are surveyed in chapter 10. Import of proteins into chloroplasts relies on interaction of protein N-terminal transit sequence with specific lipids. Chapter 11 reviews a development of thylakoid membranes with respect to lipids. Specific role for particular lipids was observed, monogalactosyldiacylglycerol is involved in formation of prolamelar body and differentiation of thylakoids. Importance of lipid unsaturation for plastid differentiation as well as for repair of PS 2 was found. Chapter 12 concerns products of photosynthesis, triglycerides. The success in recombinant DNA technology enables to explain biosynthesis of fatty acids by various thioesterases. Advance in research of desaturation by genetic manipulation of desaturases could lead to new oils. Chapter 13 regards genetic engineering of the unsaturation of membrane glycerolipids and its importance for a tolerance towards temperature stress. It was revealed by means of cyanobacteria transformation that polyunsaturated fatty acids are essential for protection against photoinhibition at low temperatures. Chapter 14 reviews genetic approach to investigation of membrane lipid structure in relation to photosynthetic function. The last chapter covers the involvement of chloroplast lipids in the responses of plants to stress *i.e.* temperature, ozone and some herbicides.

As follows from this description of book the most recent progress in the area of lipids in photosynthetic apparatus structure and function are reviewed in this book. New aspects in the role of thylakoid lipids namely in maintaining proper membrane structure and properties are elucidated. The book can be recommended for all experts interested in all branches of photosynthesis research as basic source.

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