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# Editorial

Lipid–nucleic acid interactions and recognition represent the least known and also least studied type of interactions between biomacromolecules, which also include polysaccharide–nucleic acid and polysaccharide–lipid interactions. The almost one decade that has passed since the previous special issue on nucleic acid-lipid interactions [Zhdadov and Kaptien (eds.), Appl. Magn. Resonance 7 (1994) 1–147] was published has witnessed a considerable increase of interest in both fundamental and applied studies on DNA–bound lipids and membranes. First, it could be shown that pools of loosely and tightly bound lipids exist, which consist of both neutral and charged phospholipids. Thus, the hypothesis of two pools of DNA–bound lipids inside the genome received new support, which keeps interest in this topic going. Second, a number of papers were devoted to the study of the structure of DNA–liposome complexes called lipoplexes (or genosomes) by a variety of techniques, and the dependence of the transfection efficacy on the structure of lipids in these complexes. This opened a wide field of applications of lipoplexes with plasmid DNA (reporter genes a well as therapeutic genes) in gene transfer. It should be mentioned, however, that in clinics special attention is currently also paid to gene transfer by means of electroporation (even in the case of therapeutic genes) as an alternative technique for local gene therapy.

The papers in the present special issue address various aspects of DNA–bound lipids and membranes. Review articles summarize the achivements obtained in this field as mentioned above, but also the many applications of lipoplexes for gene transfer and therapy. Moreover, natural DNA–bound lipids, DNA–lipid recognition phenomena and the characterization of complexes between DNA and hydrophobic amines are discussed. This includes chromatin/DNA–bound lipids and nuclear lipids, their role for DNA structure and function (expression) in chromatin as well as their metabolism. Original papers are devoted to interactions between DNA and hydrphobic amines studied by optical methods, and of nucleic acids with surfaces of organized phospholipids, as well as to properties and applications of DNA–lipid complexes. Small-angle synchrotron X-ray diffraction is used to study DNA–surfactant complexes, and the electrostriction method with supported lipid membranes to investigate the interaction of anionic surfactants, DNA–surfactant complexes and DNA–lipid membrane interactions. The role sphingosine for the DNA–lipid interaction is examined by means of giant unilamellar liposomes, and the DNA–phospholipid recognition is investigated by a computational technique. The importance of membrane–nucleic acid interactions even for the origination of initial cells and for the prokaryote-to-eukaryote transition is discussed. Finally, three papers are devoted to the development of DNA–based biosensors. Either supported lipid bilayers or traditional solid supports are used for immobilization of DNA, while detection is achieved by means of the electroectivity of guanine or by electrochemical indicators of DNA hybridization. We believe that these papers should provide valuable information not only for the specialists but also for all those working in various fields related to DNA–lipid interaction and recognition, gene transfer and DNA biosensors.

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