

DNA – cationic liposomes supramolecular assemblies: the structure and transfection efficiency

Daniela Uhríková¹, Lukáš Hubčík¹, Petra Pullmannová^{1,2}, Ľubica Lacinová³, Sergio S. Funari⁴, Ferdinand Devínsky¹, José Teixeira⁵

¹Comenius University, Faculty of Pharmacy, Bratislava, Slovakia

²Faculty of Pharmacy, Hradec Králové, Czech Republic

³Institute of Molecular Physiology and Genetic, Slovak Academy of Sciences, Bratislava, Slovakia

⁴Hasylab, DESY, Hamburg, Germany

⁵Laboratoire Leon Brillouin CEA Saclay, France

The interaction of DNA polyanion with a dispersion of cationic liposomes results in a formation of supramolecular assemblies of regular inner microstructure - lipoplexes. They serve as a delivery vectors for genetic material. Despite the fact that lipoplexes have been used for transfection, and commercial lipid formulations are available, their efficiency needs to be improved. We will discuss and compare structural variety and binding capacity for DNA of lipoplexes prepared from neutral phospholipids with positive charges created either by cationic gemini surfactants (CnGS) or by divalent metal cations. The binding capacity of lipoplexes for DNA is in the range 40-95 % depending on the system, as we derived from spectrophotometry. A small angle synchrotron X-ray diffraction (SAXD) and neutron scattering (SANS) were used to examine the microstructure of assemblies. Selected lipoplexes have shown good transfection efficiency for plasmid pEGFP using HEK 293 cells.

Acknowledgement: Experiment were supported by MS SR VEGA 1/1224/12 and APVV 0212-10.