

NOVEL COMB-LIKE POLY(ETHYLENE IMINE)/POLY(2-ETHYL-2-OXAZOLINE) COPOLYMERS AS GENE DELIVERY VECTOR SYSTEMS

Emi Haladjova^a, Silvia Halacheva^b, Denitsa Momekova^c, Stanislav Rangelov^a

^a Institute of Polymers, Bulgarian Academy of Sciences, Sofia 1113, Bulgaria

^b University of Bolton, Deane road, Bolton, Greater Manchester, BL3 5AB, U.K

^c Faculty of Pharmacy, Medical University of Sofia, Sofia 1000, Bulgaria

Gene therapy refers to treatment of genetic disorders by modifying gene expression within specific cells with main challenge: the efficient delivery of nucleic acids to the diseased cells. The huge potential of the method is directly related to the vector system, which should be non-toxic and safe for the patients.

The aim of this work is to obtain low toxic and effective DNA delivery systems based on novel well-defined comb-like linear polyethyleneimine/poly(2-ethyl-2-oxazoline) (LPEI-comb-PEtOx) copolymers. They were used to form polyelectrolyte complexes with DNA. Polyplexes in a wide range of N/P ratios (1-30) were prepared. The inherent properties of the polyplexes such as size and zeta potential as a function of the chain architecture and molar mass were monitored and were characterized by dynamic and electrophoretic light scattering. Experiments for DNA transcription in prokaryotic and eukaryotic cells were carried out as well. The investigated systems displayed very high cell viability and ability to introduce DNA molecules into the cells. Their transfection efficiency strongly depended on the polymer structure and composition.

Acknowledgements:

This work was funded by the National Science Fund (Bulgaria) Project T02/7.