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Cationic block copolymer based nanocarriers for Proteins and Nucleic Acids

One of the goals of polymeric nanomedicine is the creation of functional nanocarriers for pharmaceutical compounds taking advantage of developments in polymer synthesis and control over polymer self-assembly. The aim of this presentation is to discuss block copolymer based advanced nanocarriers for insulin and nucleic acids. We have utilized several novel cationic block polyelectrolytes for complexation with insulin and DNA/RNA as well block copolymer micelles encapsulating magnetic iron oxide nanoparticles for introducing multifunctionality in our polymer based nanocarriers. Static, dynamic and electrophoretic light scattering techniques and transmission electron microscopy were used in order to extract information on the size, charge and morphological characteristics of the nanostructures. Cytotoxicity, internalization into cells and gene transfection studies were also performed in the case of DNA/RNA carriers. Toxicity of nanocarrier systems was low. Application of a magnetic field improved gene transfection in cell lines investigated.

Speaker Biography

Stergios Pispas is Director of Research at TPCI-NHRF. He serves as the chairman of the Scientific Council of TPCI-NHRF (since 2016) and an Advisory Board Member of the European Polymer Journal (2017) among other editorial duties. He has been awarded the American Institute of Chemists Foundation Award for Outstanding Post-doctoral Fellow (1995) and the A. K. Doolittle Award of the American Chemical Society (2003). He is a coauthor of more than 300 research articles in referred journals, several invited review articles and three books, receiving more than 7500 citations (h-index=40). His current research focuses on the synthesis of functional block copolymers by controlled polymerizations and the development of complex, hybrid, self-organized nanostructures based on designed synthetic polymers and biomacromolecules and inorganic nanomaterials for nanomedicine applications.

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