

Control of pDNA packaging by block copolymers toward systemic gene delivery



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Block copolymer assembly receives substantial attention as a platform system to deliver therapeutic agents to the intended cells within the body for achieving targeted therapy. The assemblies formed with plasmid DNA (pDNA), polyplex micelles, are capable of potential gene delivery system, being an alternative to the viral-based one. The issues are how to encapsulate the large molecular weight polyelectrolyte of pDNA with several MDa into a sub-100 nm-sized core of polyplex micelle, and how to deliver it to the target cells evading severe biological protection system. This talk will present our approach to develop smart polyplex micelles based on strategic design of block copolymers, placing a particular emphasis on controlling pDNA packaging, for achieving therapeutic outcomes in intractable tumors through systemic application.