**Polymers in Biomedical applications**

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Triggered-release of encapsulated therapeutics from nanoparticles without remote or environmental triggers was demonstrated in this work.1 Disassembly of the polymer nanoparticles to unimers at precise times allowed the controlled release of oligo DNA. The polymers used in this study consisted of a hydrophilic block for stabilization and second thermoresponsive block for self-assembly and disassembly. At temperatures below the second block's LCST (i.e. below 37 oC for in vitro assays), the diblock copolymer was fully water soluble, and when heated to 37 oC, the polymer self-assembled into a narrow size distribution of nanoparticles with an average diameter of approximately 25 nm. The thermoresponsive nature of the second block could be manipulated in situ by the self-catalyzed degradation of cationic 2-(dimethylamino)ethyl acrylate (DMAEA) units2,3 to negatively charged acrylic acid groups, and when the amount of acids groups was sufficiently high to increase the LCST of the second block above 37 oC. The disassembly of the nanoparticles could be controlled from 10 to 70 h. We also have used similar systems as self-aduvanting vaccines, siRNA delivery vechicles and vaccine therapeutics.

Scheme 1: Timed-release mechanism for the self-catalyzed PDMAEA nanoparticles.

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