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Self-Assembly of DNA–Graft Copolymer Nanoparticles ZONGHUI WEI, Northwestern University, YONG REN, JOHN-MICHAEL WILLIFORD, HAI-QUAN MAO, Johns Hopkins University, ERIK LUIJTEN, Northwestern University, NORTHWESTERN UNIVERSITY COLLABORATION, JOHNS HOPKINS UNIVERSITY COLLABORATION — Self-assembled DNA–copolymer nanoparticles are promising gene delivery systems due to their high biocompatibility. Notably, such nanoparticles can exhibit a variety of morphologies. Previously, we demonstrated that the nanoparticle shape can be tuned through variation of solvent polarity in a solution of DNA and block copolymers. Moreover, we confirmed that this shape can influence transfection efficiency [1]. In terms of ease of manufacturing as well as tunability of the system, it is important to explore the possibility of employing other types of condensing agents. Here, we report on the use of polyelectrolytes with grafted PEG side chains, which offer facile synthesis and an additional control parameter in the form of grafting density. Via a combination of experiments and molecular dynamics simulations we demonstrate that a high degree of shape control of the micellar nanoparticles can indeed be achieved through variation of the density and length of the grafted side chains. [1] Jiang, X.; Qu, W.; Pan, D.; Ren, Y.; Williford, J. M.; Cui, H. G.; Luijten, E.; Mao, H. Q. Advanced Materials **25**, 227–232 (2013).

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