Stimuli-responsive Polymers and Nanomicelles for Gene Delivery

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The efficient delivery of DNA into cells is critical to the success of many biotechnology and medical applications (e.g., gene therapy). Though recombinant viral gene-delivery vectors have been effective in this regard, their use in medical applications has been limited by their toxicity and immunogenicity, as well as difficulties associated with their large-scale preparation. In principle, these problems could be circumvented by the use of cationic polymers, which have consequently become one of the most promising vectors for gene transfection. However, the weak interactions formed between DNA and cationic polymers result in low transfection efficacy. Furthermore, the polyplexes formed between cationic polymers and DNA generally exhibit poor stability and toxicity because of the large excess of cationic polymer typically required for complete DNA condensation. Herein, we report the preparation of a novel class of stimuli-responsive and bioreducible cationic polymers and nanomicelles that can form strong interactions with DNA and completely condense DNA at low N/P ratio. The polyplexes exhibited high biocompatibility and performed very effectively as a gene-delivery system.[1,2]

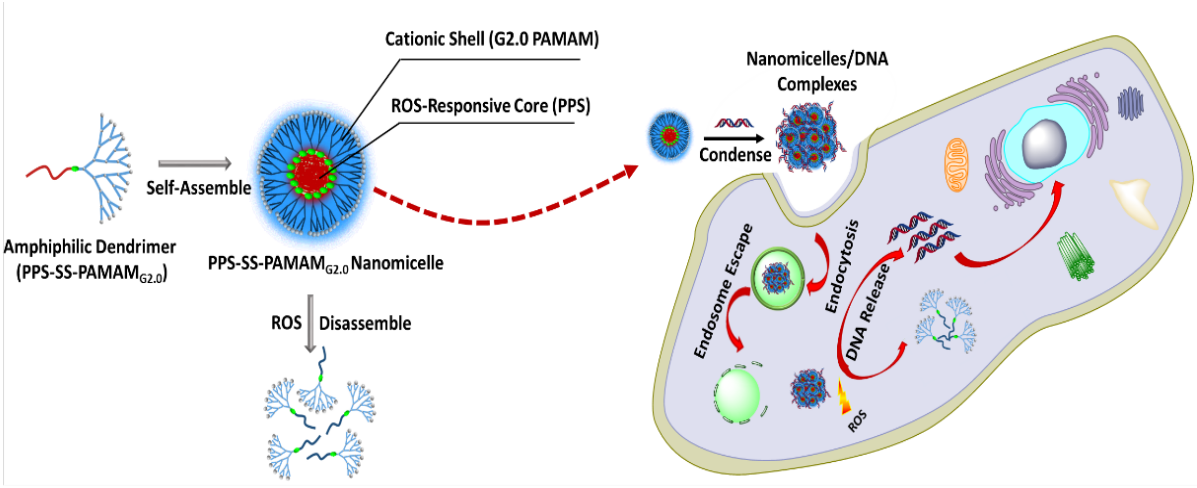

Figure 1:The outline of stimuli-responsive nanomicelles for gene gelivery.

References

1. LH. Wang, D.C. Wu, Y.Z. You, et al. Angew. Chem. Int. Ed. 755-758 (2016): 55.
2. LH. Wang, T. Wu, D. C. Wu, Y. Z. You, et al. Acs Applied Materials & Interfaces 19238-19244 (2016): 8.