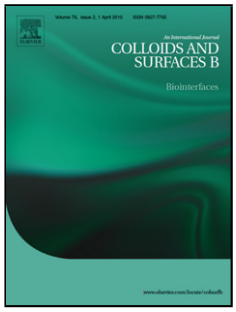
Accepted Manuscript



Title: In Situ Biodegradable Crosslinking of Cationic Oligomer Coating on Mesoporous Silica Nanoparticles for Drug Delivery

Author: Yifeng Wang Jine Wang Yang Yang Yi Sun Yuan Yuan Yulin Li Changsheng Liu

PII: S0927-7765(17)30113-3
DOI: http://dx.doi.org/doi:10.1016/j.colsurfb.2017.02.033
Reference: COLSUB 8405

To appear in: *Colloids and Surfaces B: Biointerfaces*

Received date: 22-9-2016
Revised date: 16-1-2017
Accepted date: 25-2-2017

Please cite this article as: Y. Wang, J. Wang, Y. Yang, Y. Sun, Y. Yuan, Y. Li, C. Liu, In Situ Biodegradable Crosslinking of Cationic Oligomer Coating on Mesoporous Silica Nanoparticles for Drug Delivery, *Colloids and Surfaces B: Biointerfaces* (2017), http://dx.doi.org/10.1016/j.colsurfb.2017.02.033

In Situ Biodegradable Crosslinking of Cationic Oligomer Coating on Mesoporous Silica Nanoparticles for Drug Delivery

Yifeng Wang[a], *Jine Wang*[a], *Yang Yang*[a], *Yi Sun*[a], *Yuan Yuan*[a], *Yulin Li*[a,b]* *and* *Changsheng Liu*[a]*

[a] The State Key Laboratory of Bioreactor Engineering and Key Laboratory for Ultrafine Materials of Ministry of Education, Key Laboratory for Ultrafine Materials of Ministry of Education, Engineering Research Centre for Biomedical Materials of Ministry of Education, East China University of Science and Technology, Shanghai 200237, China.

[b] Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Key Laboratory for the Synthesis and Application of Organic Functional Molecules, Ministry of Education, College of Chemistry and Chemical Engineering, Hubei University, Wuhan 430062, People's Republic of China.

Corresponding author. E-mail address: yulinli@ecust.edu.cn (Yulin Li), liucs@ecust.edu.cn (Changsheng Liu)

ABSTRACT: Although layer-by-layer assembly using anionic and cationic polymer has been a popular way to develop core-shell nanoparticles, the strong electrostatic interactions may limit shell degradability, thus hampering their application as a platform for controlled therapeutic delivery. In this study, we demonstrate a simple approach to developing mesoporous nanohybrids via a process of pre-drug loading (using doxorubicin (DOX) as a model drug) into mesoporous silica nanoparticles (MSN), followed by surface functionalization with a kind of cationic oligomer (low molecular weight polyethylene imine, LPEI) and in situ crosslinking by degradable *N*,*N*'-bis(acryloyl)cystamine (BAC). The presence of LPEI shell affords the nanohybrids with charge-reversal ability, which means that the acidic tumor extracellular microenvironment can transform the negative surface charge at neutral