TBIS

Topic of the Speech:
Magnetic-Silk Core-Shell Nanoparticles as Potential Carriers for Drug and Gene Delivery

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Dr. Xiubo Zhao obtained his BEng in Biochemical Engineering from China in 2003 and his PhD from The University of Manchester in 2007. Following his PhD he was a postdoctoral research fellow for 5 years at the University of Manchester. In 2012, he joined the Department of Chemical and Biological Engineering at the University of Sheffield.

His research interests include bio-printing, biomaterials, bio-interfaces, bio-colloids, and biosensors. He has published 5 book chapters and more than 70 peer reviewed papers (h-index 31) in high-quality journals, such as Biomaterials, Biomacromolecules, Biosensors and Bioelectronics, Chemical Society Reviews, Langmuir, Soft Matter, Small, Sensors and Actuators B: Chemical.

His work on reactive inkjet printing of silk materials has attracted media attention and has been reported on ScienceDaily.com, Phys.org, ScienceNewsJournal.com, nextbigfuture.com, american-laboratory.com etc. He has been frequently invited to review papers for more than 30 peer reviewed journals.

ABSTRACT SUBMISSION

-For invited speaker only

Magnetic-Silk Core-Shell Nanoparticles as Potential Carriers for Drug and Gene Delivery

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ABSTRACT (NO MORE THAN 500 WORDS:)

Efficient and cost-effective methods for the fabrication of nanoparticles are highly desired for the applications of drug and gene delivery. In this talk, a simple one step and cost effective method has been explored to fabricate magnetic-silk core-shell nanoparticles (MSPs) for targeted delivery of curcumin and c-myc antisense oligodeoxynucleotides (ODNs) into MDA-MB-231 breast cancer cells. The size and zeta potential of the particles were controlled and optimized by varying the fabrication conditions. Curcumin loaded silk nanoparticles showed enhanced cytotoxicity and higher cellular uptake in the human MDA-MB-231 cells. Targeted delivery was achieved by using an external magnet. On the other hand, reduced cytotoxicity were achieved for magnetic silk/PEI core−shell nanoparticles (MSPPs) compared with PEI coated magnetic nanoparticles (MPPs). MSPPs were capable of delivering the ODNs into MDA-MB-231 cells and significantly inhibited the cell growth. Through magnetofection, high ODN uptake efficiencies (over 70%) were achieved within 20 min, exhibiting a significantly enhanced uptake effect compared to the same carriers via non-magnetofection. The successful delivery of curcumin and ODNs makes the silk nanoparticles promising candidates for targeted drug and gene delivery.