J Material Sci Eng 2013, 2:4
http://dx.doi.org/10.4172/2169-0022.S1.012

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering
October 07-09, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

The duration of modeled micrograviy directs the differentiation of mesenchymal stem cells

Jun Chen
Traditional Chinese Medicine Hospital of Shan Xi Province, China

Growing evidence shows that physical microenvironments and mechanical stresses, independent of soluble factors, help influence mesenchymal-stem-cell fate. Here we demonstrate that modeled microgravity (MMG) can regulate the differentiation of mesenchymal stem cells into different directions, which might be a new strategy for tissue engineering and regenerative medicine. rMSCs were cultured respectively in normal gravity and in a clinostat to model microgravity for 72 h or 10 d, followed with diverse differential medium. The short time stimulation (72 h) promoted MSCs to endothelial, neuronal and adipogenic differentiation. On the contrary, the long time microgravity (10 d) promoted MSCs to osteoblast differentiation. Meanwhile, the short time intervention of MMG decreased RhoA activity significantly, but when we prolonged microgravity effect time to 10 days, the activity had a notable increase. When we used RhoA activity blocker, we explored that long time microgravity effects were reversed. We conclude that the duration of MMG could regulate the differentiation fate of mesenchymal stem cells via RhoA-related pathway.

Biography

Jun Chen has completed his Ph.D. at the age of 28 years from The Forth Military Medical University. He is the clinical doctor of department of encephalopathy in Traditional Chinese Medicine Hospital of Shan Xi Province. He has published more than 7 papers in reputed journals.

2002819ch@fmmu.edu.cn

Layer-by-layer synthesis of quantum dots embedded gelatin nanoparticles for bio-imaging application

Longyan Chen
University of Western Ontario, Canada

In this study, a new class of highly fluorescent, photostable and biocompatible core/shell gelatin nanoparticles have been synthesized via a combination approach of two-step desolvation method and the layer-by-layer (LBL) assembly technique. The morphology, structure and photoluminescence (PL) of nanoparticles were then investigated by SEM, TEM, fluorometer and confocal fluorescent microscopy (CFM), respectively. The results show that the as-made gelatin nanoparticles consist of gel-like gelatin core and a surrounding shell of polyelectrolytes where four layers of hydrophilic CdSe QDs are assembled through the LBL method. The QDs-gelatin nanoparticles (QDs-GNPs) have a typical overall diameter around 400 nm, 20 nm of which is attributed to the polyelectrolyte shell. In addition, EDX analysis demonstrates that the CdSe QDs are successfully embedded inside the polyelectrolytes layers. A strong PL with the maximum emission at 613 nm has been detected by a fluorospectrometer under the excitation of the light of 470 nm. The newly optical nanoparticles with inherent stability and biocompatibility potentially provide a robust platform for simultaneously bio-imaging and drug delivering applications.

Biography

Longyan Chen is currently a fourth year Ph.D. student in the department of Chemical and Biochemical Engineering, University of Western Ontario, Canada. He is working under the supervision of Dr. Jin Zhang. His research focuses on synthesis and modification of micro/nanomaterials with unique optical and magnetic properties for bio-sensing and bio-imaging applications. He has published 7 papers in peer-reviewed journals.

lchen266@uwo.ca