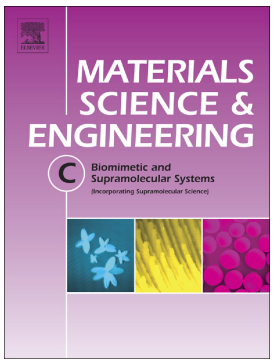
Accepted Manuscript



Nanotopographical cues of electrospun PLLA efficiently modulate non-coding RNA network to osteogenic differentiation of mesenchymal stem cells during BMP signaling pathway

Maryam Izadpanahi, Ehsan Seyedjafari, Ehsan Arefian, Ahmad Hamta, Simzar Hosseinzadeh, Mossa Kehtari, Masoud Soleimani

PII: S0928-4931(17)34004-3
DOI: doi:10.1016/j.msec.2018.08.023
Reference: MSC 8817

To appear in: *Materials Science & Engineering C*

Received date: 9 October 2017
Revised date: 3 June 2018
Accepted date: 7 August 2018

Please cite this article as: Maryam Izadpanahi, Ehsan Seyedjafari, Ehsan Arefian, Ahmad Hamta, Simzar Hosseinzadeh, Mossa Kehtari, Masoud Soleimani , Nanotopographical cues of electrospun PLLA efficiently modulate non-coding RNA network to osteogenic differentiation of mesenchymal stem cells during BMP signaling pathway. Msc (2018), doi:10.1016/j.msec.2018.08.023

Nanotopographical Cues of Electrospun PLLA Efficiently Modulate Non-coding RNA Network to Osteogenic Differentiation of Mesenchymal Stem Cells during BMP Signaling Pathway

Maryam Izadpanahi[1,4], Ehsan seyedjafari[3], Ehsan Arefian[2], Ahmad Hamta[1], Simzar Hosseinzadeh[6,4], Mossa kehtari [4], Masoud Soleimani[5]

1. Department of Biology ,Faculty of Science, Arak University ,Iran.

2.Department of Microbiology, School of Biology, College of Science, University of Tehran

3.Department of Biotechnology, College of Science, University of Tehran, Tehran, Iran

4. Stem cell Technology Research Center, Tehran, Iran

5.Hematology Department, Faculty of Medical Science, Tarbiat Modares University

6.Department of tissue engineering and regenerative medicine, school of advanced technologies in medicine, shahid beheshti university of medical sciences, Tehran, Iran

Corresponding author:

1- Masoud Soleimani: soleim_m@modares.ac.ir
2- Ehsan Arefian :arefian@ut.ac.ir

Abstract

Application of stem cells in combination with nanofibrous substrates is an interesting biomimetic approach for enhanced regeneration of damaged tissues such as bone and cartilage. The investigation of the complex interplay between nanotopographical cues of niche and noncoding RNAs in stem cells fate is an effective tool to find a new strategy for enhancing the induction of osteogenesis. In this study, we investigated the effects of aligned and random orientations of nanofibers as a natural ECM-mimicking environment on the network of noncoding RNA in mesenchymal stem cells. Aligned and randomly oriented Ploy (L-lactide) PLLA scaffolds were fabricated via electrospinning. Human Adipose Tissue-Derived Mesenchymal Stem Cells (hASCs) were isolated from adipose tissue and were cultured on surfaces of these scaffolds. Their capacity to support hMSCs proliferation was also investigated by MTT assay and the expression of c-Myc gene. Then, after 7,14, and 21days, the osteogenic commitment of hMSCs and the miRNA regulatory network in BMP signaling pathway were evaluated by