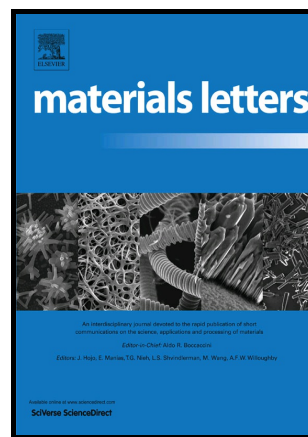


Author's Accepted Manuscript

Enhanced human osteoblast cell functions by “net-like” nanostructured cell-substrate interface in orthopedic applications

Fei Yin, Shiqi Yang, Shan Hu, Shihuan Kuang, Qingyou Han



PII: S0167-577X(16)31830-4
DOI: <http://dx.doi.org/10.1016/j.matlet.2016.11.077>
Reference: MLBLUE21771

To appear in: *Materials Letters*

Received date: 16 September 2016
Revised date: 18 November 2016
Accepted date: 22 November 2016

Cite this article as: Fei Yin, Shiqi Yang, Shan Hu, Shihuan Kuang and Qingyou Han, Enhanced human osteoblast cell functions by “net-like” nanostructured cell substrate interface in orthopedic applications, *Materials Letters* <http://dx.doi.org/10.1016/j.matlet.2016.11.077>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and a review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Enhanced human osteoblast cell functions by “net-like” nanostructured cell-substrate interface in orthopedic applications

Fei Yin^{1,2}, Shiqi Yang³, Shan Hu¹, Shihuan Kuang^{3,*}, Qingyou Han^{1,2,*}

¹School of Engineering Technology, Purdue University, West Lafayette, Indiana, 47907, USA

²Brick Nanotechnology Center, Purdue University, West Lafayette, Indiana, 47907, USA

³Department of Animal Sciences, Purdue University, West Lafayette, Indiana, 47907, USA

skuang@purdue.edu

hanq@purdue.edu

* Corresponding author. Tel.: +1 765 494 5866; fax: +1 765 494 6219.

Abstract

In this study, a novelty “net-like” nanostructured cell-substrate interface to enhance the human osteoblast cell’s functions in orthopedic applications was proposed. This novelty “net-like” nanostructured surface was fabricated on 316L stainless steel by using ultrasonic shot peening. The *in vitro* study indicated that this “net-like” nanostructured cell-substrate interface could significantly enhance the attachment, spreading and proliferation rate of the human osteoblast cells (Saos2) compared with the as-received surface with coarse grains. The enhancement of cell functions could be attributed to the high density grain boundaries in the “net-like” nanostructured surface, which could promote protein adsorption when material comes in contact with biological environments.

Keywords: “Net-like” nanostructured cell-substrate interface; Metals and alloys; Ultrasonic shot peening; Human osteoblast cell; Biomaterials.

Download English Version:

<https://daneshyari.com/en/article/5463650>

Download Persian Version:

<https://daneshyari.com/article/5463650>

[Daneshyari.com](https://daneshyari.com)