

Accepted Manuscript

Effect of PHB/chitosan/Bioglass nanofiber scaffold on proliferation and differentiation of stem cells from human exfoliated deciduous teeth into odontoblast-like cells

Maryam Khoroushi, Mohammad Reza Foroughi, Saeed Karbasi, Batool Hashemibeni, Abbas Ali Khademi



PII: S0928-4931(17)33371-4
DOI: doi:[10.1016/j.msec.2018.03.028](https://doi.org/10.1016/j.msec.2018.03.028)
Reference: MSC 8449
To appear in: *Materials Science & Engineering C*
Received date: 21 August 2017
Revised date: 16 March 2018
Accepted date: 28 March 2018

Please cite this article as: Maryam Khoroushi, Mohammad Reza Foroughi, Saeed Karbasi, Batool Hashemibeni, Abbas Ali Khademi , Effect of PHB/chitosan/Bioglass nanofiber scaffold on proliferation and differentiation of stem cells from human exfoliated deciduous teeth into odontoblast-like cells. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Msc(2018), doi:[10.1016/j.msec.2018.03.028](https://doi.org/10.1016/j.msec.2018.03.028)

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 review of the resulting proof before it is published in its final 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.

Effect of PHB / Chitosan / bioglass nanofiber scaffold on proliferation and differentiation of stem cells from human exfoliated deciduous teeth into odontoblast-like cells

Maryam Khoroushi¹, Mohammad Reza Foroughi^{2,*}, Saeed Karbasi³, Batool Hashemibeni⁴,
Abbas Ali Khademi⁵

¹ Dental Materials Research Center and Department of Operative and Art, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran

^{2,*} Dental Materials Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran

³ Department of Biomaterials and Tissue Engineering, School of Advanced Technologies in Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

⁴ Torabinejad Dentistry Research Center and Department of Anatomical Sciences and Molecular Biology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

⁵ Torabinejad Dentistry Research Center and Department of Endodontics, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran

*Corresponding author: +98(31)3792 5510, mr.foroughi@dnt.mui.ac.ir

ABSTRACT

Scaffolds and their characteristics play a central role in tissue engineering. The purpose of this study was to determine the effects of Polyhydroxybutyrate (PHB)/Chitosan/nano-bioglass (nBG) nanofiber scaffold made using the electrospinning method, on the proliferation and differentiation of stem cells obtained from human exfoliated deciduous teeth into odontoblast-like cells. In this experimental study, the pulps of the molten deciduous teeth were isolated, thereafter, the Stem cells from human exfoliated deciduous teeth (SHED) were extracted and then the 3-(4,5-dimethylthiazolyl)-2,5-diphenyltetrazolium bromide (MTT) assay was used to determine the cell viability percentage. The expression of some stem cell genes was studied by flowcytometry. These cells were then subjected to odontoblast by using the Bone morphogenetic proteins-2 (BMP2) growth factor in the differentiation medium and for the expression of their specific genes. Primers of collagen type-I, dentin sialophosphoprotein (DSPP) and alkaline phosphatase (ALP) were used and the percentage of differentiation to odontoblast cells in induction scaffolds was investigated using Real-time PCR and immunohistochemistry methods. The results revealed a 6-fold increase in the expression of DSPP genes and collagen type-I, and a 2-fold increase in the expression of ALP in scaffold with BMP2 group compared to the scaffold as control group which according to the immunohistochemical test results, showed the extracted SHED to have been differentiated into dentin odontoblast-like cells. As a result, this scaffold can be used as a suitable substrate to apply in dentin tissue engineering.

Keywords: Scaffold; Stem cells from human exfoliated deciduous teeth (SHED); Odontogenic differentiation, Bone morphogenetic proteins-2 (BMP2)

Download English Version:

<https://daneshyari.com/en/article/7866323>

Download Persian Version:

<https://daneshyari.com/article/7866323>

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