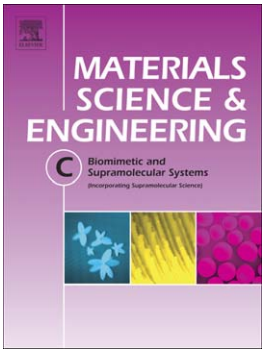

Fabrication and characterization of $SrAl_2O_4$: Eu^{2+} Dy^{3+}/CS-PCL electrospun nanocomposite scaffold for retinal tissue regeneration

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Fabrication and characterization of $SrAl_2O_4$: $Eu^{2+}Dy^{3+}$ /CS-PCL Electrospun Nanocomposite Scaffold for Retinal Tissue Regeneration

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Abstract

Millions of people around the world become blind due to loosing a part of the retina cells. In tissue engineering field one way to address this issue is to develop a retina tissue by scaffolds based on structure and signals received These scaffolds can play an essential role in repair and reformation of the damaged retina tissue. Here, $SrAl_2O_4$: Eu^{2+}, Dy^{3+} nanophosphor were prepared by sol-gel method and then coated with PEG to become biocompatible. Next 10%, 30% and 50% concentration of the coated nanophosphors were dispersed in CS-PCL copolymer and electrospuned to form $SrAl_2O_4$: Eu^{2+}, Dy^{3+} / CS-PCL scaffolds. The aforementioned photo –luminescence-scaffolds were studied for their optical, mechanical and morphological characteristics . finally the effect of these scaffolds on the mice RPCs cells' proliferation and differentiation was observed. The 30% nanophosphor dispersion scaffold while providing adequate mechanical flexibility and integrity, and exhibiting superior proliferation rates and acceptable differentiation into retinal neural cells (particularly photo receptors retinal) is suggested as a promising choice in retinal tissue repair.

Keywords:

Retina; Photoluminescence; Electrospinning; Scaffold; nanophosphor

1. Introduction

Retina is one of well-developed structures within cell-bodies and synapses, characterized in distinct layers [1]. Degenerative retinal diseases such as retinitis pigmentosa or age-related macular [2] affect millions of people and if left untreated would lead to irreversible blindness [3]. Mending degenerative retinal diseases, Exhaustive research has been conducted and various treatment approaches proposed. Among these, retinal tissue engineering introduces versatile treatment options. Retinal implant is of the most recent approaches which restores useful vision for limited visual abilities by stimulating the surviving retinal nerve cells. It is