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Asymmetric bi-layer composite membrane containing Boron-modified nano bioactive glass for guided bone regeneration

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Barrier membranes only allow the osteoprogenitor cells to populate in the bony defect area and prevent migration of the unfavorable cells. In this study, we designed a novel bilayered membrane composed of one layer from cellulose acetate prepared by the solvent casting method and the second layer from cellulose acetate/gelatin/boron-modified bioactive glass nanofibers prepared by the electrospinning method. Boron-modified bioactive glass particles with mole percentages of (51% SiO₂, 38% CaO, 4% P₂O₅, 7% B₂O₃) were synthesized and characterized. The obtained material was amorphous and had a particle size distribution in the range of 30-60 nm. The top surface of membrane composed of cellulose acetate was hydrophobic and had smooth non-porous structure. We prepared the bi-layered structure by incorporating the nano bioactive glass particles which generated bioactive glass gradient along the material thickness. Water-contact angles and tensile strength measurements, in vitro biomineralization test in the simulated body fluid (SBF) and in vitro biocompatibility test of the membranes using the mesenchymal stem cells and Saos-2 cell line are under investigation.

Biography

Reza Moonesi Rad has completed his DVM from Urmia Azad University. He, currently, is a PhD student in the Biotechnology Department in Middle East Technical University. We thank the Scientific and Technological Research Council of Turkey (TÜBİTAK) for the financial support to this research (1001 project No: 114R042).

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