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Preparation of a nanobiocomposite scaffold containing boron modified bioactive glass nanoparticles and biopolymers of cellulose acetate/pullulan/gelatin and evaluation of its application in dentin tissue engineering

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Every year a large number of dental restorations are carried out in the world and most of them do not succeed. Dentin layer has a mineral structure and it is the most damaged part in tooth caries. A regenerative approach for repairing of the damaged dentin-pulp complex or generating a new tissue is needed. We synthesized boron modified bioglass nanoparticles and developed a three-dimensional boron modified bioglass nanoparticles/cellulose acetate/pullulan/gelatin (b-BGNPs/CA/PULL/GEL) based scaffold to investigate its application potential for dentin regeneration. The composition of obtained b-BGNPs was almost consistent with the designed composition. FTIR analysis revealed that synthesized bioglass, possessed the characteristic functional groups related to the compositions before and after boron modification. Scaffolds containing aligned and tubular structures with diameter of 11.6 μm were obtained by thermally induced phase separation (TIPS) and porogen leaching methods. Human Dental Pulp Stem Cells (hDPSCs) were isolated from human third molars by the enzymatic digestion method. *In vitro* degradation analysis, porosity measurements, mechanical tests, *in vitro* biomineralization studies and also cell culture studies are under investigation.

Biography

Reza Moonesi Rad has completed his DVM from Urmia Azad University and currently is a PhD student in the Biotechnology Department in Middle East Technical University.

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Notes:

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Page 52