## عنوان مقاله:

In vitro Studies of Polycaprolactone Nanofibrous Scaffolds Containing Novel Gehlenite Nanoparticles


## محل انتشار:

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## خلاصه مقاله:

Background: Recently, many studies have been done on the physicochemical properties and biocompatibility of polycaprolactone (PCL) scaffolds containing ceramic reinforcers in the field of bone tissue engineering. In this study, the physical, mechanical and biological properties of electrospined-fabricated PCL scaffolds containing gehlenite (GLN) nanoparticles (NPs) as a novel bioceramic were investigated. Methods: To obtain the appropriate mechanical properties, the solution contains ۳%, ۵%, ۷%, and ۱۰% wt. of GLN NPs were prepared. Fiber morphology was investigated by scanning electron microscopy. In order to evaluate the NPs distribution, Energy Dispersive X-Ray Spectroscopy, X-ray diffraction, and Fourier Transform Infrared Spectroscopy spectroscopy were used. The scaffold hydrophilicity was measured by the water contact angle test. The tensile test was used to check the mechanical strength of the scaffold. The proliferation of MG-۶۳ cells was evaluated by the MTT test. Alkaline phosphatase (ALP) activity of MG-۶۳ cells was also examined. Results: Average fibers' diameters and porosity of PCL/GLN۷% were obtained ۱۵۰–۵۰۰ nm and ۸۰%, respectively. An increase in the scaffold hydrophilicity was observed by the addition of GLN NPs. The strength of PCL/GLN۷% was higher than the blank PCL scaffold. Cell proliferation of scaffolds containing GLN was higher than the blank PCL scaffold. A significant increase in the secretion of ALP for GLN-loaded scaffolds was seen. Discussion: The results showed that PCL/GLN۷% composite scaffold could be a good candidate for bone tissue engineering. Conclusion: The overall results indicate that the scaffold (PCL /GLN۷%) has suitable mechanical properties, a great cell compatibility for bone tissue regeneration.



## کلمات کلیدی:

Electrospinning, gehlenite nanoparticles, gelatin, polycaprolactone, tissue engineering