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Effect of the pore size in a 3D bioprinted gelatin scaffold on fibroblast proliferation

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Abstract

Significant efforts have been applied toward fabricating three-dimensional (3D) scaffolds using 3D-bioprinting tissue engineering techniques. Gelatin has been used in 3D-bioprinting to produce designed 3D scaffolds; however, gelatin has a poor printability and is not useful for fabricating desired 3D scaffolds using 3D-bioprinting. In this study, we fabricated pore size controlled 3D gelatin scaffolds with two step 3D-bioprinting approach: a low-temperature (–10°C) freezing step and a crosslinking process. The scaffold was crosslinked with 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide hydrochloride (EDC) and *N*-hydroxysuccinimide (NHS). The pore sizes of the produced 3D gelatin scaffolds were approximately 30% smaller