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Scaffolds from chemically modified cellulose nanofibers for skin tissue engineering

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Abstract

The objective of this research is to develop a three-dimensional porous scaffold to support cell adhesion and proliferation and to guide cells moving into the repair area in the wound healing process by using electrospinning technique. A series of modified cellulose/PVA nanofibers scaffolds in different concentrations were prepared and blended to evaluate the optimal tissue engineering scaffold. The cross-linking nanofibers scaffolds were characterized by scanning electron microscope (SEM), Fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). SEM images revealed that with decreasing cellulose content the average diameters of blend nanofibers were increased from 241±17.03 to 320±27.17 nm. Biocompatibility assay showed cells attached and spread actively on all modified cellulose nanofibers scaffolds with globular morphology after 7 days culturing which exhibit excellent biocompatibility and enhancement of cell penetration and growth within nanofibers mats. Results indicate that the modified cellulose have potential application in skin tissue engineering.