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Autor(en) des Beitrags:

Titel des Beitrags:
Mechanical properties and in vitro behavior of nanofiber-hydrogel composites for tissue engineering applications

Abstract:
Hydrogel-based biomaterial systems have great potential for tissue reconstruction by serving as temporary scaffolds and cell delivery vehicles for tissue engineering (TE). Hydrogels have poor mechanical properties and their rapid degradation limits the development and application of hydrogels in TE. In this study, nanofiber reinforced composite hydrogels were fabricated by incorporating electrospun poly(epsilon-caprolactone) (PCL)/gelatin 'blend' or 'coaxial' nanofibers into gelatin hydrogels. The morphological, mechanical, swelling and biodegradation properties of the nanocomposite hydrogels were evaluated and the results indicated that the moduli and compressive strengths of the nanofiber reinforced hydrogels were remarkably higher than those of pure gelatin hydrogels. By increasing the amount of incorporated nanofibers into the hydrogel, the Young's modulus of the composite hydrogels increased from 3.29 +/- 1.02 kPa to 20.30 +/- 1.79 kPa, while the strain at break decreased from 66.0 +/- 1.1

Stichworte:
Cell Proliferation Cell Survival Cells, Cultured Compressive Strength Elastic Modulus Equipment Design Equipment Failure Analysis Gelatin/*chemistry Humans Hydrogels/chemistry Materials Testing Mesenchymal Stromal Cells/*cytology/*physiology Nanostructures/*chemistry/*ultrastructure Particle Size Polyesters/*chemistry