

UV-Reactive Electrospinning: Preparation, Characterization and Cell Culture Applications of Nanofiber Scaffolds Containing Keratin

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Abstract : Our first aim was to synthesize Hydroxy Apatite (HAP) and then modify its surface by adding 4-Vinylbenzene boronic acid (4-VBBA). The characterization was done by FT-IR. By adding Polyvinyl alcohol (PVA) to 4-VBBA-HAP, we obtained a suitable electrospinning solution. PVA solution which was also modified by using alkoxy silanes, in order to prevent the scaffolds from being damaged by aqueous cell medium, was added. Keratin was dissolved and then added into the electrospinning solution. Keratin containing 4-VBBA-HAP/PVA composite was used to fabricate nanofiber scaffolds with the simultaneous UV-reactive electrospinning technique. The structural characterization was done by FT-IR. Thermal gravimetric analysis was also performed by using TGA. The morphological characterization was determined by SEM analyses. Our second aim was to create a scaffold where cells could grow. With this purpose, suitable nanofibers were chosen according to their SEM analysis. Keratin containing nanofibers were seeded with 3T3, ECV and SAOS cells and their cytotoxicity and cell proliferation were investigated by using MTT assay. After cell culturing process morphological characterization was determined by SEM analyses. These scaffolds were designed to be nontoxic biomaterials. Here, a comparison was made between keratin containing 3T3, ECV and SAOS seeded nanofiber scaffolds and the results were presented and discussed.

Keywords : cell culture, keratin, nanofibers, UV-reactive electrospinning

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