Abstract Submitted
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Dental Pulp Stem Cell Differentiation on Poly-4-vinyl-pyridine surfaces[1] GIULIA SUARATO, Department of Materials Science and Engineering, SUNY at Stony Brook, ANEEL BHERWANI, Oral Biology and Patology, SUNY at Stony Brook, CHUNG-CHUEH CHANG, MIRIAM RAFAILOVICH, Department of Materials Science and Engineering, SUNY at Stony Brook, MARCIA SIMON, Oral Biology and Patology, SUNY at Stony Brook — In the regeneration of a natural tissue, the mechanics and the chemical properties of the artificial substrate play a critical role. In this study, the influence of poly-4-vinyl-pyridine scaffold morphology on dental pulp stem cell differentiation was analyzed. Cells were plated on spun cast films and electrospun fibers with diameters ranging from nano to micrometers. Confocal microscopy showed the presence of various cell morphologies: on microfibers cells conform precisely to the main axis of elongation, while on nanometric scaffolds they result spread and in contact with several fibers. Even if the surface chemistry was identical, a great variation in the curvature was present. From day 9 of incubation, spontaneous biomineralization in the absence of induction agents occurred only on the fibrous structures. The SEM revealed template deposits directly on the microfibers, while on the nanofibers large spherical islands were also present. EDAX determined hydroxyl apatite nature of the deposits. RT-PCR indicated upregulation of osteogenic markers, confirming differentiation. SEM also revealed the presence of ECM fibers covering the polymer structure, which may enhance the expression of focal adhesion sites on the cell membrane.

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