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Use Electrospinning to Introduce Graphene into Poly(4-Vinylpridine) (P4VP) Polymer Fibers and Their Biocompatibility with Dental Pulp Stem Cells (DPSCs)[1] LINXI ZHANG, CHUNG-CHUEH CHANG, MIRIAM RAFAILOVICH, Stony Brook University — Graphene-polymer composite materials have been popularized in tissue engineering due to the outstanding thermal, electrical and mechanical properties of graphene. Most of the current studies, however, focus on 2-D structured films which hardly represent the real conditions of scaffolds in vivo environment and dispersion of graphene in polymer matrix has always been challenging since the graphene tends to aggregate. In our study, we have successfully introduced graphene nanoplatelets (GNPs) into poly(4-vinphylpridine) (P4VP) matrix and fabricated nano- and micro-scale size fibers by using electrospinning technique. SEM and TEM reveal uniform defect-free fiber structures and good dispersion of graphene; DSC and AFM indicate the enhancement of physical properties. The biocompatibility of the electrospun 3-D scaffolds with dental pulp stem cells (DPSCs) has been examined. Our results show that the cells can accelerate proliferation to respond to the existence of GNPs. SEM with EDAX reveals a deposition of mineralized calcium matrix on the fibers after 35-day incubation, which has possibly been caused by cell differentiation induced by fibrous scaffolds.

[1]Electrospinning Nano- and Mirco-scale size Poly(4-vinphylpridine) Fibers Loaded with Graphene Nano Platelets(GNPs)

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