Mimicking Native Extracellular Matrix with Phytic Acid-Crosslinked Protein Nanofibers for Cardiac Tissue Engineering

Abstract:
A functional scaffold fabricated is developed from natural polymers, favoring regeneration of the ischemic myocardium. Hemoglobin/gelatin/fibrinogen (Hb/gel/fib) nanofibers are fabricated by electrospinning and are characterized for morphology, scaffold composition, functional groups and hydrophilicity. It is hypothesized that ex vivo pretreatment of mesenchymal stem cells (MSCs) using 5-azacytidine and such a functional nanofibrous construct having a high oxygen-carrying potential could lead to enhanced cardiomyogenic differentiation of MSCs and result in superior biological and functional effects. The combination of a functional nanofibrous scaffold composed of natural polymers and crosslinked with a natural crosslinking agent, phytic acid, and stem cell biology may prove to be a novel therapeutic device for treatment of myocardial infarction.

Stichworte: cardiogenic differentiation crosslinkers ischemic myocardium mesenchymal stem cells phytic acid

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