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Poster Abstract

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Title: E-Matrix™: A Fetal-Like Extracellular Scaffold for Tissue Integration

Abstract:

E-Matrix™ is a hydrogel co-polymer of gelatin and dextran designed as an open, polar fetal-like connective tissue scaffold for cell attachment and interaction. Cells binding to this scaffold alter gene expression to facilitate cell proliferation, differentiation and integration. In vitro, treated dermal fibroblasts form aggregates with close cellular apposition and interdigitating membranes. This interaction is accompanied by gene expression changes shown by DNA microarray analysis (VEGF receptor, matrix metalloproteinase and associated inhibitor and genes active in tissue regeneration and immune function) and quantitative PCR (TGF-β3). E-Matrix™ increased TGF-β3 expression 13-fold, TGF-β1 2-fold with no change in the reporter gene GAPDH. Increased TGF-β3 expression was dependent on intact E-Matrix™ co-polymer as gelatin alone had no effect. The increased TGF-β3 to TGF-β1 ratio is also observed during scarless fetal wound healing. The ability of E-Matrix™ to bind, aggregate and alter cellular gene expression make it a promising material for tissue engineering, including such broad applications as producing aggregated cell constructs to seed tissue sites and for use with engineered cells or tissue remnants to enhance integration and specialization at implant sites. Overall, the material provides a resilient substrate for tissue engineering applications, especially for the integration of implanted material within host tissue.