

Microgel-based Delivery of Bioactive Soluble Factors for Articular Cartilage Engineering

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During the growth of articular cartilage in hydrogel scaffold *in vitro*, the extracellular matrix elaborated by chondrocytes hinders further diffusion of nutrients with time in culture. This causes spatially inhomogeneous mechanical properties. Thus, the goal of our study is to investigate the use of polymeric microgels as a delivery vehicle for essential nutrients which is embedded in a chondrocyte-seeded agarose scaffold to overcome the problem of decreased diffusion of nutrients. In particular, we study the effects due to the *in situ* delivery of vitamin C and TGF- β 3 using embedded microgels made up of poly(sebacic anhydride) polymer. This polymer has earlier been reported to be biocompatible and biodegradable. We also discuss the effects of polymer concentration on the cell viability and the possible mechanisms of cytotoxicity as well as ways of mitigation.