

Acrylate Copolymeric Nanogels for Tissue Engineering of Articular Cartilage

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Incorporation of nanogels in hydrogel scaffolds used in tissue engineering can have several advantages such as sustained release of nutrients and growth factors, finer control of the scaffold degradation rates, porosity modification, mediation of cell signaling and enhancement cell adhesion through appropriate functionalization. In this study, we report the synthesis, characterization and application of acrylate-based copolymeric nanogels in engineering of articular cartilages from bovine chondrocytes. Nanogels are synthesized using the inverse microemulsion technique. The degree of cross linking and functionalization of nanogels was characterized using XPS, NMR, and FTIR spectroscopy. Size and surface charge of the nanogels were characterized using dynamic light scattering and electrokinetic measurements. The effect of nanogels on the mechanical strength and biochemical composition of engineered bovine cartilages is discussed.