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483 Click-crosslinkable Collagen Hydrogels For Cytocompatible 3D Culture In Regenerative Medicine

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Hydrogels provide a three-dimensional (3D) framework with tissue-like elasticity for culturing cells in regenerative medicine. Injectable materials delivered in aqueous solution are considered ideal for the introduction of cells and bioactive factors through minimally invasive methods to fill complex 3D shapes. A novel injectable click-crosslinkable collagen-based hydrogel has been created capable of cell encapsulation *in vitro/in vivo*. The objectives were to prepare a novel cross-linking strategy for the formation of hydrogels with varied mechanical and physical properties to examine differentiation and proliferation with dental pulp stem cells (DPSCs). Collagen was thiolated by a substitution reaction using Traut's reagent at pH 7.4 without the need of an additional base. The degree of functionalization was quantified using a TNBS assay and circular dichroism was used to confirm the ratio of positive to negative peaks (RPN) was comparable to native collagen. The hydrogels were formed in 10 minutes by a thiol-ene photo-click reaction using violet light (405 nm) between the thiolated collagen and poly(ethylene glycol) norbornene. Varied mechanical and physical properties of the gels have been made by varying the molar ratio of SH: norbornene and the degree of thiol functionalization. The effect of degradation on the mechanical and physical properties were studied using both simulated body fluid and collagenase. The prepolymer solution was prepared in PBS and DPSCs and G292 cells were encapsulated in the gel *in vitro*. Cell spreading, cell migration and cell survival were analysed using ATP assay and LIVE/DEAD staining.

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