TAILORABLE HYBRID HYDROGELS FOR MEDICINAL APPLICATIONS

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Thermoresponsive block copolymers undergoing gelation at body temperature are embracing numerous biomedical and pharmaceutical applications. The formed hydrogel may serve as a drug carrier of an encapsulated drug. The carrier serves as a protection against hydrolysis and enzymatic degradation. Furthermore, it may enable targeted delivery and controlled gradual release resulting in increased therapeutic activity compared to repetitive administrations [1].

A thermosensitive triblock copolymer composed of poly(*D*,L-lactide-*co*-glycolide) PLGA and poly(ethylene glycol) PEG blocks in ratio 2.5 forms a physical network at physiological temperature (37 °C) due to hydrophobic interactions. Furthermore, when functionalized by itaconic anhydride, the copolymer *α,ω*-itaconyl-PLGA-PEG-PLGA contains double bonds at the ends of the chains enabling additional photochemical crosslinking [2]. Chemical crosslinking enhances mechanical properties and lifetime of the hydrogel network. In this work, the physically stabilized hydrogel was irradiated by blue light (430–490 nm) in the presence of a hydrophilic and biocompatible photoinitiator, thus forming a chemical network. The resulting hydrogel is stabilized with the so-called hybrid network and is potentially applicable as a resorbable wound dressing or injectable drug carrier. The release of the drug is tailorable with chemical composition of the copolymer or with the degree of chemical crosslinking, as it depends on diffusion and degradation of the hydrogel structure [3].

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