

A Thermosensitive Polypeptide Hydrogel for Biomedical Application

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Abstract : In this study, we synthesized a thermosensitive polypeptide hydrogel by copolymerizing poloxamer (PLX) and poly(L-alanine) with L-lysine segments at the both ends to form PLX-b-poly(L-alanine-lysine) (Lys-Ala-PLX-Ala-Lys) copolymers. Poly(L-alanine) is the hydrophobic chain of Lys-Ala-PLX-Ala-Lys copolymers which was designed to capture the hydrophobic agents. The synthesis was examined by ¹H NMR and showed that Lys-Ala-PLX-Ala-Lys copolymers were successfully synthesized. At the concentration range of 3-7 wt%, the aqueous copolymer solution underwent sol-gel transition near the physiological temperature and exhibited changes in its secondary structure content, as evidenced by FTIR. The excellent viability of cells cultured within the scaffold was observed after 72 hr of incubation. Also, negatively charged bovine serum albumin was incorporated into the hydrogel without diminishing material integrity and shows good release profile. In the animal study, the results also indicated that Lys-Ala-PLX-Ala-Lys hydrogel has high potential in wound dressing.

Keywords : polypeptide thermosensitive hydrogel, tacrolimus, vascularized composite allotransplantation, sustain release

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