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Preparation of Drug-Immobilized Anti-Adhesion Agent using Visible Light-Curable Alginate Derivative Containing Furfuryl Group

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Abstract

This study demonstrated the anti-adhesion and wound healing effect of a visible light curable anti-adhesion agent using an alginate derivative modified with a furfuryl moiety. Visible light-curable furfuryl alginate (F-Alg) was prepared in conjugation with alginate and furfurylamine by an amide coupling reaction, and the conjugated F-Alg was characterized by ^{1}H-NMR analysis. The cytotoxicity, cell adhesion, and cell permeability of the F-Alg were evaluated for use in anti-adhesion applications. Drug immobilization and protein release were assessed to verify whether the alginate derivatives and drugs were photo-immobilized. In *in vivo* anti-adhesion testing, the new anti-adhesion agent prepared in this study acted as a physical protective layer by forming a biofilm on the surgical site. Additionally, along with gradual decomposition of the photo-crosslinked alginate derivative, the immobilized drug was released, and additional effects such as accelerated wound healing are expected. Thus, visible light-curable F-Alg has good application potential as an anti-adhesion agent.

Keywords: alginate, anti-adhesion, furfuryl group, riboflavin, visible light