Tissue-Engineered Full-Thickness Artificial Skin Using Visible Light-Curable Gelatin with Autologous Dermal Fibroblasts and Epidermal Keratinocytes

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Introduction

The purpose of this study was to introduce hydrogel material for development of tissue-engineered full-thickness artificial skin using visible light-curable gelatin with autologous dermal fibroblasts and epidermal keratinocyte for treating wounds.

Materials and Methods

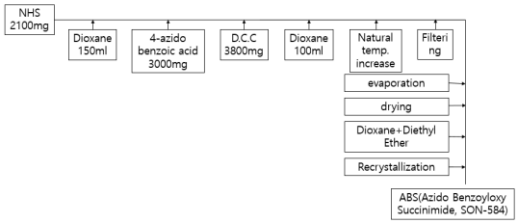
Cultured autologous fibroblasts were seeded on the visible light-curable gelatin and gelatinization was occurred. After fibroblast gelatinization, cultured autologous keratinocytes were seeded on the layer of fibroblasts to create full-thickness artificial skin.

To create tissue-engineered full-thickness artificial skin using visible light-curable gelatin with autologous dermal fibroblasts and epidermal keratinocytes, we need to develop the hydrogel using gelatin/ABS (azido benzoyloxy succinimide) and FITC-BSA using confocal dish.

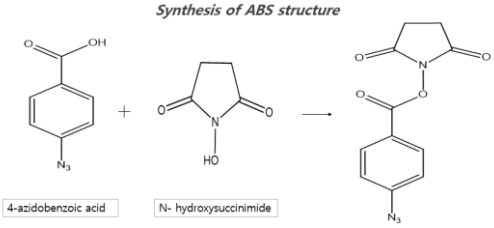
Results

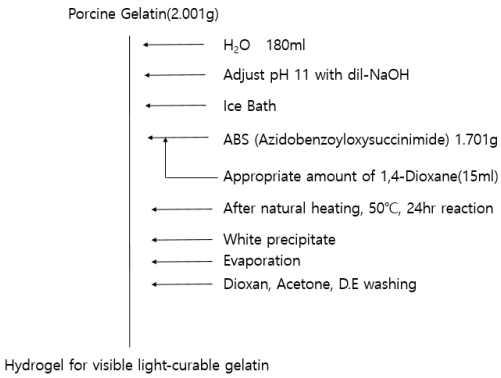
First of all, our group produced and synthesized ABS structures as following methods. After synthesis of ABS structure, we produced hydrogel type for visible light-curable gelatin for cell-seeding scaffold to create the tissue-engineered full-thickness artificial skin.

Production of ABS(Azido Benzoyloxy Succinimide)



Synthesis of ABS structure





Conclusion

Tissue-engineered full-thickness artificial skin using visible light-curable autologous dermal fibroblasts and epidermal keratinocytes may be an effective and safe for treatment of wounds. We look forward to create the gelatin for tissue-engineered full-thickness artificial skin and larger pivotal in vivo studies to confirm these initially promising findings.