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Stabilization of growth factor (EGF, TGF-β, BMP-2) using natural polymer derivatives containing photo-curable functional groups

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Growth factors such as EGF, TGF-beta, and BMP-2 affect various biological activities in the body. However, the application of biomedical applications is very limited because the physiological activity of the body is rapidly reduced due to its short half-life characteristic in the body. Thus, protein immobilization methods have been developed to overcome the low stability and high cost of growth factors. However, there are drawbacks to the methods that have been studied so far. As a typical example, a method using a chemical agent can produce a byproduct that can potentially cause denaturation of the immobilized protein. Also, when applied to proteins, it is difficult to immobilize them by the same chemical method because each amino acid residue is different. In order to solve these problems, a photo-curable natural polymer was prepared by introducing UV and visible reactive functional groups into natural polymers such as gelatin, chitosan and hyaluronic acid which have high biocompatibility and biodegradability. Photo-curable natural polymers incorporating photo-reactive groups have the property of being cured when irradiated with light of a specific wavelength such as UV and visible light. Using these characteristics, the team developed a photo-immobilization method that can immobilize proteins. Immobilization methods using photo-reactive functional groups on natural polymers having excellent biocompatibility and functionality as such are expected to be utilized in various fields in the medical field. Typical examples include scaffolds and implants, anti-adhesion agents, wound dressings, and bio-patches. In this study, we have developed a method of immobilization by introducing UV and visible light curing functional groups into various natural polymers and using curing properties in response to specific wavelengths. In this paper, we propose a new method to overcome the disadvantages of existing immobilization methods and apply them to a wider range of medical materials.

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