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Paper Title:	Optimization of methacrylated silk fibroin and methacrylated gelatin photocrosslinked hybrid hydrogels
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Abstract

Hydrogels are widely used materials in tissue engineering. Gelatin is a widely used natural polymer in hydrogel creation; however, it has some disadvantages, such as rapid degradation. To enhance the properties of gelatin and make it more suitable for tissue engineering, it was combined with silk fibroin. Photocrosslinking is a method for hydrogel formation that does not require toxic chemical reactions. In this study, the methacrylate group was introduced onto the silk fibroin and gelatin polymer chains, enabling these polymers to react with a photoinitiator when exposed to UV light. The successful introduction of the methacrylate group was confirmed by FT-IR analysis. To fabricate the hydrogel, the effects of UV exposure time and photoinitiator concentration were studied. The results showed that the optimal UV exposure time was 15 minutes and the optimal photoinitiator concentration was 0.2% w/v, which yielded a gel fraction of nearly 100%. Moreover, the hydrogels maintained shape stability in a balanced salt solution for at least 30 days, indicating that this hydrogel system can maintain its structure for at least one month. These findings suggest that combining SFMA and GelMA in forming hydrogels via photocrosslinking can create a stable structure suitable for tissue engineering applications that require long-lasting supportive materials.
