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국문 강연제목: 모듈 어셈블리를 통한 디엔에이 하이드로젤 제막 및 응용

영문 강연제목: Functional DNA Hydrogels via Module-assembly of DNA Scaffolds
for Biomedical Applications

Abstract

Artificial ECM has often failed to achieve the required tissue compatibility to promote cell-to-cell communication and retention of cells at the target site. To address this challenge, we introduced a modulated clickable cells and DNA scaffolds to fabricate injectable cellular hydrogel assembled by click chemistry. In our system, metabolically engineered cells serve as active building units for the final construct as well as therapeutic agents. In contrast, DNA microscaffolds with pre-assigned clickable moieties serves as a depot for cells to maintain their biological functions in vivo localization. Notably, the final construct has ultra-soft mechanical properties, enabling the injection of an intact therapeutic matrix without surgery. In addition, our cellular DNA hydrogel incorporates multiple cell types for synergetic effect with controllable cell density. The active linkages between the cells and DNA scaffolds could be gradually diluted as the cells proliferate, allowing the desired dislodging of cells. The subsequent slow disintegration of the cellular DNA hydrogel also allows for the successful replacement of the damaged tissue.

Brief Biosketch

Ph.D. Department of Biological and Environmental Engineering, Cornell University, Ithaca, New York, 2004 -2009

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