

Synthesis of the Heparin-based hydrogel for tissue engineering

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The synthesis of the heparin-based hydrogel was performed using the carbodiimide chemistry. Carboxyl groups of heparin were modified with cysteamine to have the thiol groups. The degree of thiolation of the heparin was varied from 10% to 70% of available carboxylic acid groups. And the thiolated heparin maintains its binding affinity to antithrombin. Then, poly(ethylene glycol) dicarylate was reacted with thiolated heparin, yielding the cross-linked hydrogel. The cross-linking of the hydrogel was characterized in physiological condition by a rheometer. Both elastic modulus G' and viscous modulus G'' were measured in real time during the gelation which takes place directly between parallel rheometer plates. The results confirmed that the final G' is sensitive to the crosslinking density and the molecular weight of the crosslinker. This hydrogel can encapsulate the cell in situ for the tissue scaffold.