

DEVELOPMENT OF BIOACTIVE CELLULOSE SULFATES FOR BIOMEDICAL APPLICATIONS

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Cellulose is the most abundant biomolecule on earth. Chemical derivatives of cellulose have found multitude of uses in industrial and biotechnological applications. Cellulose sulfates (CS) represent a class of water-soluble derivatives that have been employed in industrial application, but not yet in medicine. Here derivatives with different degree of sulfation of anhydroglucose unit (AGU) of cellulose have been studied toward anticoagulant effects and modulating effects of growth factors with heparin-binding domains like fibroblast growth factor 2 (FGF-2). The results show that CS of higher sulfation degree have an anti-coagulant activity comparable to that of heparin with cooperative action to anti-thrombin III that inhibits thrombin and Factor Xa activity making CS interesting for anticoagulant coating of blood-contacting medical devices. Furthermore, the studies show that CS with comparable sulfation degree to heparin have a promoting activity on the mitogenic effect of FGF-2 shown in cell culture studies that indicate their application as coatings of implant materials or component of tissue engineering scaffolds in the area of traumatology and regenerative medicine.

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