

CINNAMOYL-HYALURONAN AND NANOFIBERS PREPARED THEREOF

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Hyaluronic acid in its natural form is a water-soluble polymer and its dissolving proceeds immediately after coming into a contact with moisture. Its extreme hydrophilic character prevents from several biomedical applications such as implants or anti-adhesive membranes, which must be designed to persist in an organism for defined period of time. Therefore it is necessary to increase water-stability of HA as well as to retain all its biological properties,

HA can be chemically modified to prolong its half-life in vivo and to extend the usage possibilities thereof.

The problems mentioned above are solved by the preparation of cinnamoyl hyaluronan. The nanofibers prepared from this photocurable derivative can be easily stabilized onto a surface by the solid-state photolight irradiation - mediated crosslinking. Such photochemical stabilization is achieved by the esterification of HA hydroxyls with anhydrides of trans-cinnamic acid as a photosensitive group which self-dimerizes under the UV irradiation. Several tie-points are formed onto a surface which results in increased hydrolytic stability of HA nanofibers.

Obtained derivatives were tested in electrospinning process in nanofiber layer preparation on 4 SPIN Technology. As the behaviour under aqueous conditions is limiting for biomedical applications the swelling capacity and water solubility of nanofiber layers made of cinnamoyl HA were tested. Moreover a single nanofiber was prepared and analysed by AFM and force spectroscopy to get the precise information about swelling, stiffness and solubility.

Keywords: Nanofibers, hyaluronan, AFM