Films from Hyaluronan: A View of their Preparation and Characterization

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Polymer films are crucial for a variety of industrial branches such as electronics, optics, biotechnology or medicine. Hyaluronan (HA) is a polysaccharide produced in the human body, making it suitable for use in medicine. Films from HA could be used in tissue engineering or as wound-healing materials. This study's objective is to prepare films from native HA or its hydrophobized derivatives and characterize selected properties of such films. Each specific medical application requires products prepared with specialized properties – e.g. solubility, swelling or biodegradability – all influenced by many factors, including degree of substitution or molecular weight. These structure-property relationships are therefore investigated. Additionally, the research addresses the addition of octenidine, a substance with an antibacterial effect, into the prepared films. Films from native HA and its hydrophobized derivatives were prepared by solution casting. The following properties of the films and their dependences on the film preparation conditions and polymer properties were characterized: swelling, wetting, appearance, mechanical properties, cytotoxicity and biodegradability. Before measuring the above mentioned properties, it was necessary to optimize the applied methods, namely the measurement of film thickness, mechanical properties and wetting. Octenidine was added to the film-drying solution, with its concentration in the produced films determined through UV-Vis spectrometry. Polymer films from hydrophobized HA have sufficient properties for medicinal applications. Crucially, the films are non-cytotoxic, with their stability and rate of swelling influenced by polymer properties, such as the degree of substitution, enabling specific modifications for specific applications.

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