ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
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халықаралық ғылыми-практикалық конференциясының

ТЕЗИСТЕР ЖИНАҒЫ

СБОРНИК ТЕЗИСОВ

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POLYMERIC FORMULATIONS FOR DRUG DELIVERY TO THE URINARY BLADDER

Polatkhan A.A.[1], Kaldybekov D.B.[1*], Khutoryanskiy V.V.[2]
[1]*Kazakhstan, Almaty, Al-Farabi Kazakh National University, Department of Chemistry and Chemical Technology*
[2]*United Kingdom, Reading, University of Reading, Reading School of Pharmacy*
**daulet.kaldybekov@kaznu.edu.kz*

Urinary bladder cancer occurs due to uncontrolled growth of cells in the form of a tumour in the bladder cavity and has the ninth highest incidence rate globally [1]. Intravesical drug delivery (IDD), or direct administration of therapeutic agents into the urinary bladder through a catheter, is an efficient alternative to systemic drug delivery. This allows localised treatment, minimises systemic adverse effects and improves the exposure of the diseased tissues to therapeutic agents. The major limitation of this treatment is poor drug retention due to the periodical micturition that washes out instilled drug formulations, therefore requiring frequent administration. Additionally, frequent use of catheters is uncomfortable for the patients and may cause irritation, inflammatory reactions, and infections.

A number of hydrophilic polymers have been recognised as mucoadhesive, i.e., capable of sticking to and retaining on mucosal tissues. These materials are traditionally used as matrixes in many formulations for transmucosal drug delivery [2–5]. The adhesion of these macromolecules is due to their ability to interact with mucins present on mucosal surfaces *via* non-covalent bonds such as hydrogen bonding, electrostatic interactions, chain entanglement, and diffusion. These mucoadhesive materials could potentially improve the efficacy of IDD by prolonging the drug residence in the bladder, thereby reducing the need for intermittent drug instillation.

In this study, we have used commercially available hydrophilic polymers, such as chitosan, gellan gum, and carbopol. These polymers were mediated with fluorescein sodium and their mucosal retention on *ex vivo* lamb urinary bladder tissues were evaluated using an established flow-through technique. A layer-by-layer applied chitosan-gellan gum formulation demonstrated greater retention on lamb bladder mucosa *in vitro* compared to chitosan (a "gold" standard mucoadhesive polymer) and chitosan-carbopol followed by periodic washing with artificial urine solution. The application of these novel mucoadhesive systems for drug delivery to the bladder will be discussed.

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