Accepted Manuscript

Methacrylated chitosan as a polymer with enhanced mucoadhesive properties for transmucosal drug delivery

Oluwadamilola M. Kolawole, Wing Man Lau, Vitaliy V. Khutoryanskiy

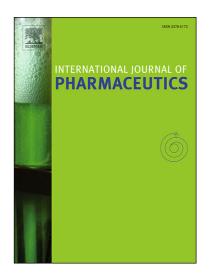
PII: S0378-5173(18)30612-4

DOI: https://doi.org/10.1016/j.ijpharm.2018.08.034

Reference: IJP 17719

To appear in: International Journal of Pharmaceutics

Received Date: 5 July 2018
Revised Date: 16 August 2018
Accepted Date: 17 August 2018



Please cite this article as: O.M. Kolawole, W.M. Lau, V.V. Khutoryanskiy, Methacrylated chitosan as a polymer with enhanced mucoadhesive properties for transmucosal drug delivery, *International Journal of Pharmaceutics* (2018), doi: https://doi.org/10.1016/j.ijpharm.2018.08.034

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Methacrylated chitosan as a polymer with enhanced mucoadhesive properties for transmucosal drug delivery

Oluwadamilola M. Kolawole^a, Wing Man Lau^b, Vitaliy V. Khutoryanskiy^{a*}

^aReading School of Pharmacy, University of Reading, Whiteknights, PO Box 224, Reading, RG6 6AD, Berkshire, United Kingdom

^bSchool of Pharmacy, The Faculty of Medical Sciences, Newcastle University, Newcastle Upon Tyne, NE1 7RU, United Kingdom

*Corresponding author at: Reading School of Pharmacy, University of Reading, Whiteknights, PO box 224, Reading, RG6 6AD, United Kingdom. Tel.: +44 (0) 118 378 6119. E-mail address: v.khutoryanskiy@reading.ac.uk

Abstract

Chitosan is a cationic polysaccharide that exhibits mucoadhesive properties which allow it to adhere to mucosal tissues. In this work, we explored chemical modification of chitosan through its reaction with methacrylic anhydride to synthesise methacrylated derivative with the aim to improve its mucoadhesive properties. The reaction products were characterised using ¹H NMR, FTIR and UV-Vis spectroscopy. ¹H NMR and ninhydrin test were used to quantify the degree of methacrylation of chitosan. Turbidimetric analysis of the effect of pH on aqueous solubility of the polymers revealed that the highly methacrylated derivative remained turbid and its turbidity did not change from pH 3 to 9. However, solutions of native chitosan and its derivative with low methacrylation remained transparent at pH 6.5 and exhibited a rapid increase in turbidity at pH > 6.5. The mucoadhesive properties of chitosan and its methacrylated derivatives were evaluated using flow-through method combined with fluorescent microscopy with fluorescein sodium as a model drug. The retention of these polymers was evaluated on porcine bladder mucosa in vitro. The methacrylated derivatives exhibited greater ability to retain fluorescein sodium on the bladder mucosa compared to the parent chitosan. Toxicological studies using MTT assay with UMUC3 bladder cells show no significant differences in toxicity between chitosan and its methacrylated derivatives suggesting good biocompatibility of these novel mucoadhesive polymers.

Download English Version:

https://daneshyari.com/en/article/8950064

Download Persian Version:

https://daneshyari.com/article/8950064

<u>Daneshyari.com</u>