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The Next Generation of Mucoadhesive Polymer

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Abstract : Purpose: This study was aimed to investigate preactivated thiomers for their mucoadhesive potential. Methods: Accordingly, chitosan-thioglycolic-mercaptonicotinamide conjugates (chitosan-TGA-MNA) were synthesized by the oxidative S-S coupling of chitosan-thioglycolic acid (chitosan-TGA) with 6-mercaptonicotin amide (MNA). Unmodified chitosan, chitosan-TGA (thiomers) and chitosan-TGA-MNA conjugates were compressed into test discs to investigate cohesive properties, cytotoxicity assays and mucoadhesion studies. Results: Due to the immobilization of MNA, the chitosan-TGA-MNA conjugates exhibit comparatively higher swelling properties and cohesive properties corresponding unmodified chitosan. On the rotating cylinder, discs based on chitosan-TGA-MNA conjugates displayed 3.1-fold improved mucoadhesion time compared to thiolated polymers. Tensile study results were found in good agreement with rotating cylinder results. Moreover, preactivated thiomers showed higher stability. All polymers were found non-toxic over Caco-2 cells. Conclusion: On the basis of achieved results the pre activated thiomeric therapeutic agent seems to represent a promising generation of mucoadhesive polymers which are safe to use for a prolonged residence time to target the mucosa.

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