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Fusidic acid-loaded Chitosan Nanoparticle Cream for Improved Antimicrobial Activity and Percutaneous Delivery

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Extended Abstract

The ineffectiveness of percutaneous antibiotic treatment, which is characterized by insufficient skin penetration and local discomfort, has been linked to antibiotic resistance [1]. Amphiphilically-modified polysaccharide-based drug delivery systems have drawn a lot of interest because of their capacity to increase skin penetration [2]. Here we describe the formation of nanoparticles from amphiphilically-modified chitosan loaded with fusidic acid prior to their inclusion into cream dosage form for the evaluation of their potential in boosting fusidic acid percutaneous penetration. Different tests were carried out to characterize the formulated cream such as the homogeneity test, pH test, spreadability test, and irritancy test. Results have shown that the cream was stable (at room temperature, 5°C, and 37°C) for 90 days, homogenous, non-irritant, with spreadability value of 8-12. The pH of the cream was around 5, which is matching the skin pH [3]. *In vitro* interactions with HaCaT cells showed no obvious cytotoxicity under settings relevant to the application, and flow cytometry analysis showed effective cellular absorption. The amphiphilic chitosan nanoparticle cream exhibited a higher rate of fusidic acid penetration through the Strat-M® membrane as compared to the unmodified chitosan nanoparticle cream using Franz diffusion cells. Fusidic acid was shown to have more antibacterial activity when loaded into amphiphilic chitosan nanoparticle cream than when put into unmodified chitosan nanoparticle cream, according to the results of the agar diffusion test. In the end, the *in vitro* findings showed that the cream made of amphiphilic chitosan nanoparticles loaded with fusidic acid has a lot of promise for percutaneous administration and deserves further investigation.

References

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