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Innovative strategies for enhancing topical drug delivery

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The development of topical delivery systems that ensures targeted and sustained release of drugs to the skin and cornea is a challenge. The design of such drug delivery system should consider the integrity of the epithelium at the site of application, the layer of the epithelium in which the disease is localized, the physicochemical characteristics of the substances to be administered and the rate at which these substances must be released to have the intended action. Innovative strategies to enhance and target drug delivery to specific organs, cells or pathological sites include nanoparticulate delivery systems and the application of physical methods such as iontophoresis and ultrasound. The aim of this work was to develop a delivery systems for application in intact and keratinized epithelia, such as skin tumors, where it is necessary to extrapolate the keratinized barrier and carry large quantities of active substance, released during long periods, for layers of the epithelium that require treatment. Therefore, the influence of the monoclonal antibody cetuximab conjugation to liposomes (immunoliposomes) in the iontophoresis skin penetration of an anticancer drug (5-FU) was investigated. Iontophoresis increased 2-fold the amount of 5-FU retained in viable epidermis, where tumors are localized, when it was encapsulated in immunoliposomes compared to liposomes. *In vivo*, iontophoresis of immunoliposomes in xenograft animal model of squamous cell carcinoma (SCC) reduced tumor growth more than 60% compared to the negative control and about 50% compared to the treatments with 5-FU solution and liposomes. The histological analysis showed the reduction of cellular proliferation for the treated groups. In conclusion, the administration of immunoliposomes containing 5-FU using iontophoresis is a promising strategy for the topical treatment of SCC.

Biography

Renata Lopez graduated in Pharmacy-Biochemistry, with master´s degree in Pharmaceutics and PhD in Pharmaceutical Sciences, both obtained at School of Pharmaceutical Sciences of Ribeirão Preto of University of Sao Paulo (FCFRP). She was a visiting scholar during PhD in University of Geneva and a 2-years visiting professor at MIT. She is an Associate Professor at FCFRP with full dedication since 1998 and leader of the research group "Center for Innovation in Nanostructured Systems and Topical Administration (NanoTop)", which focus on cutaneous and ocular penetration of drugs and the influence of nanoparticles and iontophoresis in this permeation. She has published important scientific papers, books, technological products and has received 13 awards and honors. She is the coordinator of the Post-Graduation Program in Pharmaceutical Sciences, vice-coordinator of the Support in physiopathology and ocular therapy research group and member of pharmaceutical nanotechnology network of the National Institute of Science, Technology and Pharmaceutical Innovation.

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