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PII: S0928-0987(18)30234-3
DOI: doi:10.1016/j.ejps.2018.05.015
Reference: PHASCI 4526

To appear in: *European Journal of Pharmaceutical Sciences*

Received date: 12 November 2017
Revised date: 23 April 2018
Accepted date: 15 May 2018

Please cite this article as: Eliza Wolska, Małgorzata Sznitowska, Juliusz Chorążewicz, Oliwia Szerkus, Aleksandra Radwańska, Michał J. Markuszewski, Roman Kaliszan, Krystyna Raczyńska , Ocular irritation and cyclosporine A distribution in the eye tissues after administration of solid lipid microparticles in the rabbit model. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Phasci(2017), doi:10.1016/j.ejps.2018.05.015

Ocular irritation and Cyclosporine A distribution in the eye tissues after administration of Solid Lipid Microparticles in the rabbit model

Eliza Wolska[a], Małgorzata Sznitowska[a], Juliusz Chorążewicz[b], Oliwia Szerkus[c], Aleksandra Radwańska[c], Michał J. Markuszewski[c], Roman Kaliszan[c], Krystyna Raczyńska[b]

[a] *Department of Pharmaceutical Technology, Medical University of Gdansk, Hallera 107, 80-416 Gdansk, Poland*
[b] *Department of Ophthalmology, Medical University of Gdansk, Smoluchowskiego 17, 80-214 Gdansk, Poland*
[c] *Department of Biopharmaceutics and Pharmacodynamics, Medical University of Gdansk, Hallera 107, 80-416 Gdansk, Poland*

* *Corresponding author:* Tel. +48 58 3491085; fax: +48 58 3491090.
E-mail address: eliw@gumed.edu.pl (Eliza Wolska)

Abstract

The aim of this study was to investigate the *in vivo* effect of Solid Lipid Microparticles (SLM), proposed for topical ocular administration of cyclosporine, on the rabbit eye.

SLM carrier is an aqueous dispersion of lipid microparticles (20% w/w) with a size up to 15 μm. Cyclosporine was dissolved in the formulation in the concentration of 0.5 or 2.0% (w/w). Ocular tolerance of microsphere dispersion was assessed in rabbit model by the Draize eye test (SLM was compared with emulsion and oily solution), and cyclosporine distribution in ocular tissues was evaluated after multiple application of tested formulations (SLM dispersions, emulsions and oily solution) for 7 days.

Good tolerance of cyclosporine-SLM formulation was demonstrated in the rabbit model. Concentration of cyclosporine in the precorneal tissues, such as cornea and conjunctiva, was much higher than the therapeutic value (8.4 ng/mg and 3.2 ng/mg, respectively). After SLM administration, the cyclosporine concentrations determined in the anterior ocular tissues, were also significantly higher compared to those obtained after the application of other tested carriers (emulsions and oily solution).

The obtained results prove that the recognized SLM dispersions are safe formulations for ophthalmic use. It can be concluded that lipid microparticles are highly promising for an efficient ophthalmic drug delivery, when compared to other conventional dosage forms.

Keywords: cyclosporine, solid lipid microparticles, microspheres, ophthalmic delivery, rabbit, Draize irritation test