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Preparation and *in vivo* administration of paromomycin niosomes in balb/c mice

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Background and Aims: Paromomycin (PM) is one of the most important anti-leishmaniasis drugs. For visceral leishmaniasis it use as injection form. Topical forms approved for treatment of coetaneous leishmaniasis but they have poor bioavailability due to stratum corneum, and low penetration across macrophage membrane. In the present study, PM containing niosome was prepared and characterized as new topical drug delivery system for enhancing in vivo bioavailability in balb/c mice infected with Leishmania major.
Methods: Niosomes prepared by film hydration methods and composed of Spans (20, 40, 60 or 80)/Tweens (20, 40, 60 or 80)/Cholesterol (300 µmol, different molar ratios). The pharmaceutical characteristics niosomes such as morphology, the mean volume diameter, stability of prepared vesicles and PM release from the various formulations were evaluated. The effect of niosomal-entrapped PM was also evaluated in infected balb/c mice and compared with PM solution and non-treated control groups.
Results: All prepared formulations showed good stability with encapsulation efficiency between 17 to 62%. Release profiles of PM in different formulations were best fitted with diffusion-based equations such as Baker-Lonsdale model. Histopathological studies revealed the efficacy of PM niosomes with significant difference in comparison to control groups ($p < 0.05$).
Conclusions: This study showed niosomal formulations could be used for better penetration and efficacy of compounds such as PM as a new drug delivery system in cutaneous leishmaniasis.

Keywords: Niosome; Paromomycin; Cutaneous leishmaniasis