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Preclinical safety of topically administered nanostructure lipid carriers (NLC) indicated for wound healing: biodistribution and toxicity studies

C. Vairo^{1,2} and G. Gainza¹¹BioPraxis Research AIE, R&D Department, Spain²NanoBioCel Group, Laboratory of Pharmaceutics, University of the Basque Country, School of Pharmacy, Spain

Re-activation of the healing process is a major challenge in the field of chronic wound healing. Lipid-nanoparticles, especially nanostructured lipid carriers (NLC), possess extremely useful characteristics (biodegradability, biocompatibility and long-term stability) and are suitable for drug delivery. Moreover, they maintain wound moisture due to their occlusive properties, which have been associated with increased healing rates. In the light of above, NLC have been extensively used for wound healing but, to date, there is no safety-preclinical studies of topically administered lipid-nanoparticles; thus, here, biodistribution studies were performed in rats with the NLC previously developed by our research group, using technetium-99m (^{99m}Tc-NLC) as radiomarker. ^{99m}Tc-NLC remained on the wound for 24 h and no systemic absorption was observed after administration. Moreover, toxicological studies were performed to assess NLC safety after topical administration. NLC were non-cytotoxic, non-sensitive and non-irritant/corrosive. Overall, it might be concluded that developed NLC remained at the administration area, potentially exerting a local effect, and were safe after topical administration on wounds.

cvairo@praxisph.com

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