MICROPARTICLES OF RIFAMPICIN FOR PULMONARY ADMINISTRATION IN TUBERCULOSIS: INSPECTION ON CELL UPTAKE

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Tuberculosis is an infectious, respiratory and chronic disease caused by *Mycobacterium tuberculosis (M. tuberculosis)*. Among the available treatment, Rifampicin is an antibiotic and a first line treatment. It presents a low water solubility and conversely, a high permeability property. Polymeric nanoparticles can be useful for a controlled drug delivery to improve drug efficacy in a tuberculosis setting. Here, a nano-embedded microparticles (NEMs) were designed to bypass pulmonary barriers. To address this, a Cashew gun was modified into phthalated cashew gum (PCG), which targets alveolar macrophages, by increasing hydrophobicity and ultimately improving drug encapsulation efficiency. Polymeric nanoparticles blank PN-PCG and (PN)-PCG-RF were successfully obtained by nanoprecipitation method, and their performance were investigated. The PN-PCG exhibited a particle size of 69,46 ± 1.11 nm and 112.9 ± 0.61 nm for the (PN)-PCG-RF. Negative zeta potentials were observed for both PN-PCG and (PN)-PCG-RF (-40.0 and -27.5, respectively). Scanning electron microscopy revealed NEMs-RIF in the form of spherical agglomerates. To address the possibility of PN-PCG targeting TB bacterium residing in the granuloma, we employed the phagocytosis ratio of PN-PCG probed with a fluorescent tag into macrophages as a surrogate of PN-PCG availability and effectiveness. Therefore, the cellular uptake of these materials was studied at 3 and 24 hours after treatment demonstrated efficient cellular internalization of the rhodamine nanoparticles (Rho-PN-PCG) in J774 macrophages, which was attributed to the PCG composition binding to the galactose-type lectin C receptor (MGL-2/CD301b) and indicating a time-dependent uptake pattern. RIF-NEMs were successfully developed from PN-PCG-RIF, having potential for the treatment of tuberculosis. In conclusion, PN-PCG provided to be a powerful tool for the treatment of TB.

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