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DEVELOPMENT AND CHARACTERIZATION OF POLY (L-LACTIC ACID) NANOPARTICLES CONTAINING 17-DMAG, AN HSP90 INHIBITOR, AS A POTENTIAL CHEMOTHERAPY AGENT FOR CONTROLLING *LEISHMANIA BRAZILIENSIS* INFECTION *IN VITRO*

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ABSTRACT

INTRODUCTION: Heat shock protein 90 (Hsp90) plays a crucial role in the life cycle of *Leishmania*. 17-DMAG, an Hsp90 inhibitor, was tested in BALB/c mice infected with *L. braziliensis*, resulting in reduced lesion size, pro-inflammatory cytokine production, and parasite burden. However, prolonged treatment with 17-DMAG led to symptoms of toxicity. To address this issue, 17-DMAG was encapsulated in nanoparticles (NPs) to facilitate controlled drug release. **OBJECTIVE:** To develop and characterize polymeric nanoparticles (NPs) containing 17-DMAG as a potential chemotherapeutic agent for the treatment of THP-1 cells infected with *L. braziliensis in vitro*. **METHODOLOGY:** NPs were synthesized using the double emulsion method, with poly (L-lactic acid) (PLLA) as the polymer to encapsulate 17-DMAG (PLLA-17-DMAG-NPs). Encapsulation efficiency (EE%) was determined by high-performance liquid chromatography. Cytotoxicity was assessed by CC_{50} in THP-1 cells. Physicochemical properties were analyzed by Dynamic Light Scattering, Transmission Electron Microscopy and Scanning Electron Microscopy. **RESULTS:** PLLA-17-DMAG-NPs exhibited spherical morphology and nanometric size. The encapsulation efficiency varied between 2% and 74%, with no significant differences in particle size or polydispersity index. In cytotoxicity assessments, PLLA-17-DMAG-NPs at a concentration of 2 µM showed no cytotoxicity effects, while free 17-DMAG exhibited a CC_{50} of 2.6 µM. **CONCLUSION:** PLLA nanoparticles encapsulating 17-DMAG represent a promising strategy for treating *Leishmania* infections. PLLA-17-DMAG-NPs showed high encapsulation efficiency, maintained nanometric size, and exhibited reduced cytotoxicity compared to free 17-DMAG. These findings suggest that encapsulation effectively minimizes toxicity while preserving the therapeutic potential of the drug. Further studies are planned to determine the IC_{50} of both free and encapsulated 17-DMAG and to optimize nanoformulation parameters for enhanced efficacy.

KEYWORDS: Nanoparticle; 17-DMAG; *Leishmania braziliensis*.
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