

## Evaluation of leishmanicidal profile of ursolic acid

Júnior Furini<sup>1\*</sup>; Cristiana Gonzalez<sup>1</sup>; Sérgio de Albuquerque<sup>1</sup>

<sup>1</sup>Faculdade de Ciências Farmacêuticas, Universidade de São Paulo. \*jfurini@usp.br

**Introduction:** Leishmaniasis is a group of tropical diseases caused by a number of species of protozoan parasites belonging to the genus *Leishmania*, and it affects around 12 million people in 88 countries. It is estimated that there are about two to three million new leishmaniasis cases each year, and that some 350 million people are at risk of infection. Historically, the chemotherapy of leishmaniasis has been based on the use of toxic heavy metals, particularly antimony compounds. When this kind of treatment is not effective, other medications are utilized, including pentamidine and amphotericin B. Previously, our group evaluated the activity of *Miconia* extracts and their isolated compounds like triterpenes acids against trypomastigotes forms of the *Trypanosoma cruzi* and found good results.

**Objective:** The aim of this work was evaluate the in vitro leishmanicidal effect of ursolic acid (UA) in the development of promastigotes forms of *L. chagasi* and *L. braziliensis*. **Methods:** The screening assay was performed in 96-well microplates with culture (M199 medium) that did not reach the stationary phase. Promastigotes forms, *Leishmania chagasi* and *Leishmania braziliensis*, were seeded at concentration of  $1 \times 10^8$ /mL. The plates were then incubated at 28°C for 24 h with various concentrations of the tested drugs. After the time the parasites were quantified by the MTT colorimetric method. Each concentration was assayed three times. In order to avoid drawback, medium, negative and drug controls were used in each test. Stock solutions of the compounds to be assayed were prepared in dimethyl sulfoxide (DMSO), and it was added to cultures to give a final concentration of DMSO lower than 0.2%. **Results:** The compound with the highest antileishmanial activity was the UA at concentration of 128  $\mu$ M ( $IC_{50} = 64.16 \mu$ M - *L. chagasi* and  $IC_{50} = 90.7 \mu$ M - *L. braziliensis*). The percentages of lysis in these concentrations were 68.19% for *L. chagasi* and 66.94% for *L. brasiliensis*. Amphotericin B was evaluated in the same concentrations, with 66.73% lysis at a concentration of 128  $\mu$ M. Although good results presented by this evaluation, ursolic acid showed better activity under trypomastigotes forms *T. cruzi* with  $IC_{50}$  values of 17.1  $\mu$ M. In this situation, the growth of leishmania species was practically interrupted when we administrated UA at 128  $\mu$ M, what is considerate a good perspective to continuation of the evaluations of this kind of compound against the *Leishmania* sp. **Conclusion:** Ursolic acid (UA) has demonstrated good leishmanicidal potential and should be further evaluated on amastigote forms of the parasite and other complementary assays, besides conducting the in vivo assays to confirm this potential.

**Keywords:** antileishmanial activity; ursolic acid; triterpenes

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