Highly diluted natural complex (M2) effects on leishmanias


Federal University of Paraná, Curitiba, Paraná, Brazil

Introduction: Leishmaniosis is regarded as a serious public health issue either by its magnitude, morbidity or mortality. Depending on Leishmania species disease ranges from cutaneous, which is relatively confined and controlled, until a progressive and fatal visceral disease [4]. In order to complete their lifecycle Leishmania undergo transformations in the vector digestive tract to get to metacyclic infective form [3,5]. Those include secretion of the “promastigote secretory gel” (PSG) that protect parasites from digestive enzymes. PSG acts on survival and colonization of parasites inside the vector, on transmission and infection development in mammals, and also facilitates and increases transmission [1,2]. Drugs used for leishmaniosis treatment show high toxicity and several side effects, leading patients to quit the treatment and consequently generating resistant strains. The search for new therapeutic approaches is considered a strategic research priority by the World Health Organization. Highly diluted natural products show efficacy in modifying immunological response by stimulating the immune system through macrophages activation, then favoring the organism in many pathological conditions.

Aim: To assess the direct action of M2 treatment on promastigotes of different Leishmania species.

Methods: 3x10^6 were cultured in the presence of 20% of M2 plus booster 1% doses every 24h for up to 96h at 25ºC in humidified incubator and then submitted to assays for determining mitochondrial activity by MTT (5mg/mL), cell proliferation trough cell counting on Neubauer chamber and rosettes formation (around PSG) by light microscopy. Results of 3 independent experiments were statistically analyzed using t-test.

Results: M2 treatment changed mitochondrial metabolic activity in all tested Leishmania strains. L. amazonensis proliferation decreased after 96h treatment and likewise the rosettes formation (total, closed and open ones).

Discussion: Our data show that Leishmania cultures treated with M2 present decreased number of rosettes and these rosettes may be slowing the production of PSG, that is typically synthesized by Leishmania during metacyclic infective phase. Rosettes are also a place for fusion between 2 or more leishmanias, a process that involves nuclear and kinetoplast genetic material exchange.

Conclusion: M2 acts on L. amazonensis promastigote forms by reducing the total number of rosettes (the same for open and closed rosettes) that are related to infective form of promastigotes, which produce PSG while on rosettes. This result suggests that M2 treatment is capable of decreasing Leishmania infectivity. Although our results are preliminary, these changes open new perspectives for the disease treatment and/or prevention using M2.

Keywords: promastigote secretory gel, infectivity, proliferation, rosettes.

References:


Figure 1. M2 treatment changed mitochondrial metabolic activity, cell proliferation and rosettes formation in Leishmania. Graphs A and B represent mitochondrial activity of the strains L. amazonensis, L. braziliensis, Cur 453 (L. amazonensis) and Cur 454 (L. braziliensis) treated with M2 for 48 and 72h. Graph C shows cell proliferation of L. amazonensis. The images illustrate what we considered as closed (D) and open rosettes (E), which were stained using May Grünwald and Giemsa.