Abstract

Introduction: Photodynamic therapy (PDT) using 5-aminolevulinic acid-induced protoporphyrin IX (ALA-PpIX) constitutes an interesting alternative for cutaneous leishmaniasis treatment. Objective: To evaluate the production of PpIX based on the administration of ALA and MAL and the effect of ALA-PDT at cellular level on non-infected and infected THP-1 cells using Leishmania (Viannia) panamensis or Leishmania (Leishmania) infantum (syn Leishmania chagasi) parasites. Materials and methods: Protoporphyrin IX (PpIX) production and mitochondrial colocalization were evaluated by confocal microscopy. Cell toxicities were evaluated after treatment with the compounds, followed by light irradiation (597-752 nm) at 2.5 J/cm² fluency using a colorimetric MTT assay for THP-1 cells and a standard microscopic analysis of parasites. Results were expressed as compound concentration activity against 50% of cells or parasites (CC50 or IC50). Results: ALA or MAL induced an endogenous PpIX with a red fluorescence localized mainly in the mitochondria inside human cells. ALA and MAL-PDT induced a similar range of toxicities on THP-1 cells (CC50 0.16±0.01 mM and 0.33±0.019 mM, respectively) without any apparent inhibition of intracellular parasites in the infected cells as compared to untreated controls. Exogenous PpIX-PDT was toxic to THP-1 cells (CC50 0.00032±0.00002 mM), L. (L.) infantum (IC50 0.003±0.0001 mM) and L. (V.) panamensis (IC50 0.024±0.0001 mM) promastigotes. Conclusions: Despite the effectiveness of exogenous PpIX on promastigotes and the production of PpIX by human infected cells, treatment with ALA or MAL before irradiation was unable to completely destroy L. (L.) infantum or L. (V.) panamensis intracellular amastigotes

Keywords

Aminolevulinic acid, photochemotherapy, Leishmania (Viannia) panamensis, Leishmania infantum.