In vitro efficacy of ethanolic extract of Artemisia absinthium (Asteraceae) against Leishmania major L. using cell sensitivity and flow cytometry assays

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Abstract

Leishmaniasis is one of the most neglected human diseases with an estimated global burden ranking second in mortality and fourth in morbidity among the tropical infections. Chemotherapy involving the use of drugs like glucantime is the mainstay treatment in endemic areas of Iran. Drug resistance is increasingly prevalent, so search for alternative therapy is gathering pace. Medicinal herbs, like wormwood Artemisia, have chemical compounds effective against a number of pathogens. In this study, the efficacy of ethanol extract from Artemisia absinthium (Asteraceae) against Leishmania major L. was investigated in vitro. The outcome of different effective doses (1–40 mg/ml) of ethanol extracts from this medicinal herb, A. absinthium, on a standard Iranian parasite strain of L. major was examined. The L. major promastigote cell sensitivity and mortality or viability effects due to the addition of herbal extract were measured using the MTT assay and the flow cytometry technique, respectively. There was complete agreement between the two assays. The lethal concentration (LC50) was measured as 101 mg/ml. Some contrasting relationships between the medicinal herb concentrations and the viability of parasites were observed; so that there was an increased multiplication of the parasite at low concentrations of the drug, but an anti-parasitic apoptotic effect was seen at high concentrations of A. absinthium. It was concluded that there might be one or more chemical constituents within the herbal extract of wormwood which at high concentration controlled cell division and affected the relevant activity within the only one giant mitochondrion in this flagellate parasite. At low doses, however, it showed the opposite effect of leading to mitotic cell divisions. © 2014, Indian Society for Parasitology.