Cutaneous Leishmaniasis in North Eastern Iran: reservoir hosts, sandfly vectors and leishmanial agents in the North Khorasan province

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Cutaneous Leishmaniasis (CL), caused by several *Leishmania* species, is a complex disease with a wide spectrum of clinical features. This neglected vector-borne disease, is a major public health problem worldwide and one of the most common endemic diseases in Iran. According to the World Health Organization (WHO) reports,about 900,000 to 1.3 million new cases of leishmaniasis are reported per year; of these, approximately 0.7–1.2 million are cutaneous leishmaniasis. It is estimated that 20000 new cases are reported annually in Iran, nevertheless, due to under-reporting,the actual number is almost higher. North Khorasan province in north eastern Iran is one of the important focus of CL, and this study was performed to determine the main parasites, reservoir hosts and vectors of the disease in this district. *Leishmania* positive isolates from human cases in North Khorasan province (North East of Iran),were genotyped using PCR-RFLP analysis. Wild mammals were caught from gerbil burrows and the genus and species of the rodents were determined by external morphological characteristics. *Leishmania* parasites were detected to assess the infection of reservoir hosts through microscopically methods, PCR-RFLP and phylogenetic analysis. Sand flies were collected by sticky papers and identified to species level using light microscope and keys. PCR of kDNA, ITS1-rDNA, followed by RFLP were used for identification of DNA of *Leishmania* parasites within infected sand flies. The results of this study indicated that the parasite causing cutaneous leishmaniasis in this province is *L. major*.

The results also revealed that *Rhombomys opimus* is considered as the main reservoir host of CL. Microscopic investigation on blood smear of the animals for amastigote parasites and PCR-RFLP revealed the presence of *L. major* in rodents. Two species of *Phlebotomus papatasi* and *Phlebotomus salehi*were found to be naturally infected with *L. major*. Moreover, mixed infection of *L. turanica* and *L. major* was observed in one specimen of *P. papatasi*. Characteristics of the collected *Leishmania* isolates from North Khorasan revealed that *L. major* is a predominant parasite of cutaneous leishmaniasis. Our study revealed that *R. opimus*is the most important reservoir host for maintenance of the parasite source in the area. According to the results, two vectors of cutaneous leishmaniasis were found to be active in studied area. *P.papatasi* and *P. salehi* are, like in several places, the probable vectors of cutaneous leishmaniases in this focus of cutaneous leishmaniasis. We also found that the disease is endemic in Northern Khorasan Province.

Keywords: Cutaneous leishmaniasis, *Leishmania major*, *Rhombomysopimus*, Phlebotomus, North Khorasan.