MicroRNAs Expression Induces Apoptosis of Macrophages in Response to Leishmania major (MRHO/IR/75/ER): An InVitro and In-Vivo Study

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Abstract

Background: We aimed to investigate the effect of miR-15a mimic and inhibitor of miR-155 expression on apoptosis induction in macrophages infected with Iranian strain of *Leishmania major* in-vitro and in-vivo.

Methods: RAW 264.7 cells were infected with *L. major* promastigotes (MRHO/IR/75/ER), and then were treated with miRNAs. For in-vivo experiment, BALB/c mice were inoculated with *L. major* promastigotes, and then they were treated with miRNAs. For evaluation of miRNA therapeutic effect, in-vitro and in-vivo studies were performed using quantitative Real-time PCR, Flow cytometry, lesion size measurement, and Limiting Dilution Assay (LDA).

Results: In-vitro results of flow cytometry showed that using miR-15a mimic, miR-155 inhibitor or both of them increased apoptosis of macrophages. In in-vivo, size of lesion increased during experiment in control groups ($P<0.05$) while application of both miR-155 inhibitor and miR-15a mimic inhibited the increase in the size of lesions within 6 wk of experiment ($P=0.85$). LDA results showed that microRNA therapy could significantly decrease parasite load in mimic or inhibitor receiving groups compared to the control group ($P<0.05$).

Conclusion: miR-155 inhibitor and miR-15a mimic in *L. major* infected macrophages can induce apoptosis and reduce parasite burden. Therefore, miRNA-based therapy can be proposed as new treatment for cutaneous leishmaniasis.

Keywords—*Leishmania major;* Apoptosis; microRNAs; In-vitro; In-vivo

Professional Biography (100-150 words)

I am a Ph.D. in Medical Parasitology at the age of 30 years from Shahid Beheshti University of Medical Sciences. My researches are about molecular identification, Host-Pathogen interaction (miRNA), Molecular intervention (miRNA), Animal model of cutaneous leishmaniasis, Immunoparasitology, Epidemiology, and risk map modeling. I am

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Any Comments:

It would be a great honour if I will be selected as postdoctoral researcher to deepen more my knowledge because of my great interest in working on leishmaniasis (using miRNA therapy to enhance the function of immune system against leishmaniasis) and the lack of sufficient facilities in my country. Also, I am very interested in solving new challenges in my areas of expertise.