

Role of MicroRNAs in B cell maturation and differentiation during human visceral leishmaniasis infection

Rajan Kumar Pandey* and Vijay Kumar Prajapati

Department of Biochemistry, School of Life Sciences, Central University of Rajasthan,
Bandarsindri, Ajmer, 305 817, Rajasthan, India.

*Corresponding author: rkpandey255@gmail.com

Introduction: Lymphocyte B cells play an important role to provide humoral protective immune response against *Leishmania donovani* by the producing polyclonal antibodies and the process of B cell maturation and differentiation depends on microRNA mediated gene regulation during Human Visceral Leishmaniasis (HVL) infection.

Objective: To analyze the role of miRNA in B cell maturation and differentiation during HVL infection.

Methodology: MicroRNAs are endogenously expressed, nonprotein encoding tiny RNA that negatively regulates gene expression at post transcriptional level. The present study depicts the identification of miRNA controlling expression of immune signaling molecule, genes and transcription factors using Target Scan web server, to control B-cell maturation and differentiation.

Results: Bioinformatics analysis has shown that microRNAs such as miR-1178, miR-590-3p hinders the attachment of progenitor B cell to stromal cell in bone marrow by inhibiting VCAM-1, which is essential for the conversion of progenitor B cell to precursor B cell for maturation. Seed region present in miR-432 and miR-3973 have the putative binding site in 3'-UTR region of cytokine IL-7 coding mRNA, suppress the specification and commitment of cell to the B cell lineage. Furthermore, we speculated that miR-4731-5p, miR-3678-3p, miR-4492 and miR762 may suppress the early stage B-cell maturation by suppression of various B-cell specific genes, including Pax-5, Vpre-B, λ 5 and immunoglobulin heavy chain enhancer, results in aggravation of HVL pathogenesis. Moreover, miR-141 and miR-4698 can inhibit expression of RAG-1/RAG-2 and results in non specific antibody production. We also indicate that miR-132 and miR-212 are potential microRNAs that regulate Sox-4 specific response to stop the maturation of B cell, which enhances the progression of visceral leishmaniasis disease in human.

Discussion: Our study highlights the importance of microRNAs in the B cell maturation and differentiation during *L. donovani* infection in human and provides the bioinformatics evidences to control HVL infection.