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Analysis of Methylation and Expression Profile of *Foxp3* Gene in Patients with Behçet's Syndrome

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ABSTRACT

Forkhead box P3 (*Foxp3*) gene is an important means in the Treg cells function, in both maintenances of immune tolerance and regulation of response. Epigenetic modifications of the f*oxp3* gene at its regulatory regions control the chromatin accessibility for the transcription factors and other transcriptional regulators in order to control Foxp3 expression. In addition, the methylation status of CpG islands within the Foxp3 promoter and regulatory elements regulate the expression of Foxp3. This study was performed to assess the role of the f*oxp3* gene in patients with Behçet's syndrome (BS).

Venous blood samples were collected from all participants and peripheral blood mononuclear cells (PBMC) were extracted through Ficoll-Hypaque method. Genomic DNA was randomly sheared by sonication and immunoprecipitated with a monoclonal antibody. The status methylation of the f*oxp3* gene was estimated in 108 blood samples of active BS patients and healthy individuals (controls); using methylation DNA immunoprecipitation (MeDIP) technique. Expression analysis was carried out; using Real-time PCR.

The expression of f*oxp3* gene in the patients' group (mean±SD: 1.79±1.12) was significantly lower than the healthy group (mean±SD: 2.73±1.33) (p<001). Also, the methylation levels of Foxp3 promoter showed that its level in patients (mean±SD: 2.3±1.16) was higher than the healthy group (mean±SD: 1.85±0.59). However, this increase was not statistically significant (p>0.05). Also, these results indicated that increasing the amount of methylation of the f*oxp3* gene by reducing its expression leads to an increase and intensifying of the disease.

The decrease in Foxp3 expression is possibly associated with hypermethylation of the gene, and it can be considered as a risk factor for BS. Future studies may be needed to identify the capability of specific DNA methylation alterations in this syndrome.

Keywords: Behçet's syndrome; DNA methylation; *Foxp3*; DIP

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