# Th1, Th2 and Th17 cytokine profile in patients with multiple sclerosis following treatment with rapamycin

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**Background:** Management of Multiple Sclerosis is based on the usage of immunosuppressive and immune-modulating medications. Cytokines play an important role in the pathogenesis of Multiple Sclerosis, thus, this study aimed to evaluate the effects of rapamycin on the concentrations of Th1/Th2/Th17 serum cytokines in patients with MS.

**Method:** Six patients with relapsing remitting MS as a case and 6 normal humans as a control group were enrolled. The patients have been received 2 mg rapamycin daily for 6 months and control group received nothing during 6 months of the experiment. Enzyme linked immunosorbent assay (Multi-AnalyteELISArray) technique was used for determination of serum concentrations of IL-2, IL-4, IL-5, IL-6, IL-10, IL-12, IL-13, IL-17, IFNγ, TNFα, GCSF and TGF-β before and after therapy with rapamycin.

**Results:** The mean absorbance of 10 (83.33%) out of the 12 studied cytokines showed reduction after the therapy with rapamycin including interleukins (IL), IFNγ and TNFα. The only statistically significant reduction was observed in the absorbance of IFNγ (P=0.028). Two cytokines illustrated increase in the patients' serum after the therapy, including GCSF and TGF-β (P=0.046). None of the studied cytokines in the control group varied significantly after 6 months.

**Conclusion:** Based on the findings of the present study, rapamycin has some immunosuppressive effects, such as decreasing INFγ, which can improve the quality of life of the patients with MS. The increased level of TGF-β may also have benefits on the disease, but needs further clinical studies.

**Keywords:** Multiple sclerosis, Cytokine profile, Rapamycin