The influence of serotonin on Th17-immune response in multiple sclerosis.

A.Sviridova (main author)[1], M. Melnikov[1,2], A. Boyko[1]

[1]Pirogov Russian National Research Medical University

[2]National Research Center Institute of Immunology of the Federal Medical-Biological Agency, Moscow, Russian Federation

Introduction: Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of the central nervous system (CNS) with an autoimmune mechanism of development. Serotonin may participate in MS pathogenesis by modulating immune cell activity and cytokine production.

Objectives: To study the relationship between serotonin concentration in blood plasma, characteristics of Th17 cells, and to clarify the influence of serotonin and fluoxetine on the function of Th17 cells in vitro.

Materials and methods: Data from 32 patients with relapsing-remitting MS in clinical remission and 20 healthy controls were included. The serotonin concentration in blood plasma was measured by ELISA. Circulating Th17 cells were determined by flow cytometry ($CD4^+CD26^+CD161^+$). The levels of IL-17, IFN-gamma and GM-CSF were studied by ELISA in supernatants of $CD4^+$ T cells stimulated with microbeads coated with anti-CD3/anti-CD28 antibodies in the absence and in the presence of serotonin and fluoxetine at a concentrations of 10^{-4}M, 10^{-5}M, 10^{-6}M.

Results: The plasma level of serotonin was not different between the groups. The percentages of $CD4^+$- and Th17 cells as well as production of IL-17, IFN-gamma and GM-CSF by $CD4^+$- T cells in MS patients and in the healthy subjects were comparable . Serotonin at concentration of 10^{-4} M suppressed IL-17, IFN-gamma and GM-CSF production by $CD4^+$-T cells in all groups without affecting on cell viability and proliferative responses. At a concentration of 10^{-5} M and 10^{-6} M, serotonin had no effect on cytokine production. Fluoxetine at concentration of 10^{-6} M suppressed IL-17, IFN-gamma and production GM-CSF in all groups without affecting on cell viability and proliferative responses. At concentrations of 10^{-5} M and 10^{-4} M fluoxetine suppressed cytokine production, but reduced cell viability and proliferative responses.

Conclusion: These data suggest an anti-inflammatory role of serotonin in MS.