The role of Enterococci in development of Experimental Autoimmune Encephalomyelitis

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Mammals microbiota can influence on the digestive, immune and neuroendocrine systems of the host organism. Infectious agents can play a role of a trigger mechanism leading to the development of autoimmune process such as Multiple sclerosis (MS). MS development is usually accompanied by intestinal morphological and functional disorders. It suggests that gut microbiota can influence on the development and course of the MS.

The aim of the work was to investigate the influence of gut microbiota on the experimental autoimmune encephalomyelitis (EAE) course in rats.

Materials and Methods. The EAE (experimental model of MS) was induced in female Wistar rats by inoculation of homological spinal cord homogenate (HSCH) with complete Freund's adjuvant. Changes in the gut microbiota were analyzed on the 10th and 21th day after EAE induction and before starting the experiment. Experiments were performed by real time PCR (RT-PCR) and bacteriologically. Enterococcus faecium L3 was introduced (8,0 lg CFU/rat/day) intragastrically for 16 days beginning from the HSCH inoculation. The control group of rats received physiological saline solution. The cell populations in blood were analyzed using Flow Cytometry (FC) on the 14th day of the experiment.

Results. Inoculation of HSCH induced paralysis and paresis in 97% of rats. Analysis of microbiota composition before the EAE induction demonstrated the highest level of Enterococcus spp. in the group of animals without any symptoms of the EAE (group A). The high concentration of enterococci was detected still on the 10th day (peak of clinical manifestations in EAE) in this group. The overgrowth of opportunistic bacteria (Proteus mirabilis, Citrobacter diversus, atypical E. coli) was identified in fecal samples of animals with neurological disorders (group B). Reduction of the Lactobacillus spp. content in fecal samples in group B and increase the number of Faecalibacterium prausnitzii in group A were determined on the 21th day of experiment.

Treatment with E. faecium L3 reduced the number of illness rats to 87,8% and decreased the severity of the disease. These animals had loss of body weight lower than in control group during the EAE development. The study of microbiota using RT-PCR revealed an increase in the number of F. prausnitzii after treatment. FC analysis showed that E. faecium L3 decreased the number of CD3-CD8+ T cells. The number of CD3+CD8+ T cells.

Conclusion. The high level of Enterococcus spp. and F. prausnitzii in the gut microbiota can reduce the probability of EAE development. Administration of E. faecium L3 lead to the decrease of the severity and duration of EAE course. The effect of E. faecium on EAE course can be explained by it immunomodulatory effect and by the influence on the intestinal microbiota.