IMMUNOMODULATING AND PSYCHOMODULATING ROLE OF INTESTINAL MICROBIOME IN MULTIPLE SCLEROSIS

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Introduction. Multiple sclerosis (MS) according to ICD-10 refers to the demyelinating diseases of the central nervous system. It has been established that neuroinflammation autoimmune reactions play a role in the initial stages of MS, and neurodegeneration is the cause of disease progression and disability of patients. In addition to motor and sensory disturbances, 70% of patients have gastrointestinal function disorders and 50% have psychoemotional disorders. It is assumed that a change in the composition of the intestinal microbiome is involved in the pathogenesis of MS and can mediate immune and psychoemotional disorders.

Objective. To evaluate the relationship of changes in the intestinal microbiome with the subpopulation composition of immune cells circulating in the blood and psychoemotional disorders in patients with MS.

Methods. Fecal samples of 10 healthy volunteers and 70 patients were studied. The composition of the intestinal microbiome (IM) was performed using the Illumina/Solexa sequencing method. The taxonomic identification of OTUs was carried out using the RDP database. Further analysis was carried out using the Knomics-Biota program. Phenotypes of immune cells were determined by flow cytometry. To assess the emotional state used a set of standard psychological tests.

Results. Using cluster analysis in the studied cohort of patients with MS, 2 types (5 subtypes) of IM were isolated. Two subtypes (1.1 and 2.1) of IMs were characterized by an increased level of *Actinobacteria* (>10%) and a reduced content of *Bacteroidetes* (<5%), but subtype 1.1 contained *Euryarhaeota* and an increased level of *Verrucomicrobia* (up to 30%), and in subtype 2.1 − *Firmicutes* accounted for up to 80%. In three other subtypes of IM, the content of *Actinobacteria* was comparable and did not differ from the control group, but the content of *Bacteroidetes* (25%, 38%, 55%, respectively, in subtypes 2.1, 2.2 and 2.3) and the level of *Verrucomicrobia* (up to 12%, 1−2% and 0%, respectively, in subtypes 2.1, 2.2 and 2.3) were different.

An analysis of the subpopulation composition of circulating Th cells revealed that the proportion of Th2 was higher in patients with type 1 IM, the proportion of Th17 was higher in patients with type 2 IM, while the number of DP Th17 was also increased in patients with a subtype of 2.2 IM, and in patients with 2.1 subtype − Th17.1. The presence of depression was noted in MS patients, which had an increased proportion of *Proteobacteria* and a reduced level of *Faecalibacterium prausnitzii*.

Conclusions. The results confirm the immunomodulating and psychomodulating role of the intestinal microbiome in MS.