

**The connection between the complement system and autism spectrum disorders:
fundamental and applied aspects**

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The complement system is a key component of the innate immunity. It participates in the inflammatory process. The role of the neuroinflammation in the development of mental disorders, including autism spectrum disorders (ASD) is currently proved. It attracts a significant interest of psychiatrists in connection with the prevalence in the pediatric population (average 1%).

Autistic behavior has been described independently by several researchers (Kanner, Asperger and Heller) at the beginning of the XX century. ASD consist of several heterogeneous diseases, combined set of the three core behavioral symptoms: deficiencies in language and communication, reduced sociability or a lack of social interaction, restricted interests and repetitive and stereotypical behaviors [1].

One of the immunological parameters used to evaluate the degree of neuroinflammation is the functional activity of complement. We have developed a universal method for assessment of the overall complement activity using the hardware-software complex BioLaT and ciliates *Tetrahymena pyriformis*.

Membrane attack complexes were shown to form on membranes of *Tetrahymena pyriformis* under the influence of blood serum, leading to the death of the ciliates. The time of destruction of half of the cells (T_{50}) can be used to assess the activity of complement.

In this work we studied blood serum of children with ASD and healthy children. We determined the overall complement activity of blood serum of 268 healthy children depending on age from 1 to 17 years. It was found that overall complement activity of children from 1 year to 4 years is statistically significant ($p < 0,05$) lower than that of older children. Thus, the T_{50} values of children aged 1 to 4 years were from 8.5 to 12.9 min, respectively, whereas for children aged 5 to 17 years T_{50} values were in the range from 7.6 to 8.9 minutes. For children with ASD T_{50} values range of 3.07 to 38.8 min. The results for total population of children with ASD can be divided into 3 subgroups according to the T_{50} values: below normal (39% of children), normal (25%) and higher than normal (36%) values.

Thus, for the first time it was proved the applicability of the free-swimming ciliates for overall complement activity assessment. Furthermore it was proved the effectiveness of the developed method for detection of currents of various diseases associated with inflammation. The method can be used in general medical practice because of its workability and low cost.

Источники и литература

- 1) Kidd PM. Autism, an extreme challenge to integrative medicine. Part: 1: The knowledge base. Altern Med Rev. 2002 Aug;7(4):292-316.