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# FEATURES OF CLINICAL AND IMMUNOLOGICAL COURSE OF CYTOMEGALOVIRUS INFECTION

**ABSTRACT**

The article is devoted to an actual problem of modern medicine - the study of cytomegalovirus infection. A group of children aged 2 to 5 years, often suffering from SARS with low-grade fever of unknown genesis with positive ELISA and PCR for cytomegalovirus (CMV) was examined. It was found that in children with CMV reduction of natural killer cells (CD16 +), T-helper cells (CD4 +), cytotoxic T lymphocytes (CD8 +), increase of IgM, IgG, and the CEC were marked.

**Keywords:** immunity, virus, antibody, immunoglobulin, herpes, disease, cytomegalovirus.

## INTRODUCTION

Cytomegalovirus infection - a disease caused by a cytomegalovirus - a virus of the subfamily of herpes viruses. The prevalence of cytomegalovirus infection is extremely high. Once penetrated into the body, CMV infection does not leave it - often it exists in a latent form and occurs only at lower immunity.

However, the primary infection may be an acute infectious disease. Often infection occurs even in the neonatal period and early childhood. Most often it occurs in developing countries, where the prevalence of cytomegalovirus infection among young people is much higher than in developed countries.

The most dangerous form of cytomegalovirus infection is an antenatal form, which is common for children, whose mothers suffered a primary CMV infection during pregnancy. Congenital cytomegalovirus infection often leads to developmental delay and to the many adverse consequences, including mental retardation and deafness.

The virus enters the blood of healthy people and causes a pronounced immune response that relies in the formation of antibodies - specific protective proteins - immunoglobulin M (Anti - CMV - IgM), and the main protective response against virus – T-cell.

The lymphocytes CD 4 and CD 8 have potent activity against cytomegalovirus. Cytomegalovirus infection actively develops and leads to reactivation of earlier latent infection when cellular immune response is inhibited, like formation violation CD 4 lymphocytes in AIDS, for example.

Anti-CMV-IgMare forming after about 4-7 weeks after infection, and can be found in the blood for 16-20 weeks. Finding them in the blood in these terms may be evidence of primary CMV infection. Then immunoglobulins M are replaced by immunoglobulins G1 (Anti - CMV - IgG), which are present in the blood throughout the entire life.

In most of cases, when immune status is normal, cytomegalovirus infection is asymptomatic, although it remains in the body for a long time in the form of latent infection. It is unknown where is exactly virus is contained in body, however, its presence is expected in many organs and tissues.

## OBJECTIVE OF RESEARCH

Studying the characteristics of immunity in children with cytomegalovirus infection.

## MATERIALS AND METHODS

Examination of the group of children (n = 20) aged 2 to 5 years with low-grade fever of unknown origin and manifestations of herpes on the lips with a positive ELISA CMV (Anti - CMV - IgG and Anti - CMV - IgM) and a positive PCR CMV (Table 1). Also, a group of healthy children (n = 10) matched by age was examined.

The immune status of all children was examined (CD3 +, CD4 +, CD8 +, CD16 +, CD22 +, IgA, IgG, IgM, IgE) on the basis of the National Medical Center of the Republic of Sakha (Yakutia). Comparing averages ANOVA was performed using Student's t-test for assessing equality medium Fischer F-test for equality of dispersion evaluation. The relationship between the parameters was assessed by the coefficients of the linear and rank correlation.

**Indicators of immune status of children with cytomegalovirus and healthy children in Republic of Sakha M ± m**

| Indicators | CMV-infection (n = 20) | Healthy (n = 20) |
|---|---|---|
| CD3+ | 21,2 ± 1,03 | 27,2±1,04 |
| CD4+ | 18,9 ± 0,5* | 28,3±0,6 |
| CD8+ | 16,9 ± 0,8* | 24,1±2.5 |
| CD16+ | 11,1 ± 1,2* | 22,0±1,01 |
| ИРИ | 0,7 ± 0,6 | 1,08±0,02 |
| IgA | 1,6 ± 0,1* | 2,9±0,6 |
| IgG | 18,2 ± 0,7 | 17,1±0,09 |
| IgM | 5,2 ± 0,08* | 2,2±0,09 |
| CD25+ | 13,9 ± 1,2* | 24,6±0,7 |
| ЦИК | 186,2 ± 1,5<0,05* | 70±0,07 |

The decreased CD4 + lymphocytes content, reduced the number of natural killer cells (CD16 +), T-helpers (CD4 +), cytotoxic T-lymphocytes (CD8 +), increase of IgM (Table 1) has been detected.

**Survey Results:** All children with CMV had a low-grade fever, headache, recurrent acute respiratory viral infections, tonsillitis, pharyngitis, increased sweating, fatigue, irritability.

PCR is an important method of diagnosis of CMV infection.

The materials for the study was the saliva or the oral- and the nasal-pharyngeal mucus, scraps of the epithelial cells of the urogenital tract, blood, cerebrospinal fluid, prostatic fluid, urine. Determination of immune status is necessary in addition to serological survey methods, PCR and clinical symptoms of CMV infection.

Elevated levels of IgA, IgM and CIC have been detected in 4 children from an examined group.

Conclusion:

The study of immune status and DNA analysis of a various materials in dynamics, serology (ELISA) are necessary in diagnostics of CMV infection.

The immune status changes, that revealed during diagnostics of CMV:

-Increasing activity of the immune system (increased levels of immunoglobulin IgM in serum, increased CIC,

-Reduced level CD16 + - natural killer cells, decreased T-helper CD4 level

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# ESTIMATION OF SYCHOPHYSIOLOGICAL STATUS OF STUDENTS ADAPTING IN THE SUB-ARCTIC REGION

**ABSTRACT**

The study was conducted on the basis of the Medical Institute NEFU. 44 volunteers from the university students between 18 and 23 years were the object of the study. All surveyed were male. We studied the features of psychophysiological state at forming adaptive reactions of the students M.K. Ammosov NEFU from countries with a hot climate (the main group). The control group consisted of students, representatives of indigenous ethnic groups (Yakuts, Evens). It was revealed that at adaptation to extreme subarctic climate in foreign students there are marked a shift in the balance towards the activation of the sympathetic part of the vegetative nervous system, moderate and high levels of personal anxiety, not accompanied by the perception of the majority of situations as threatening and the development of anxiety. On Harvard step-test graduation index in both groups there were no persons with the assessment of physical performance “excellent”. By indicators of heart rate variability in the main group the activity of stress-limiting systems dominated, whereas in the control – optimal adaptation indicators. It was found that the adaptive possibilities of the body of persons in the control group, estimated by the capacity of slow and fast waves, are characterized by low levels of mobilizing and reduction potential, in the main - a moderate level.

**Keywords:** psychophysiological status, population, adaptation, subarctic, region.

## INTRODUCTION

The role of psychophysiological state in forming adaptive-adaptive reactions, and in the preservation of health allows expanding our knowledge of the mechanisms of regulation of adaptive processes in the conditions of emotional stress and exposure to stressful factors in extreme climatic conditions in Yakutia [3].

**Objective:** To evaluate the psychophysiological status of students in adapting to the subarctic region.

## MATERIALS AND METHODS

The main group consisted of 14 people (Tajikistan - 8 Afghanistan - two, Kyrgyzstan - 3, Indonesia - 1), came from different regions. The second group (control) included 30 natives of indigenous nationality (Yakutsk, Evens) from different regions of the Republic of Sakha (Yakutia). All the examined were aged 17-19 years old. The survey was conducted due to ethics, with informed voluntary consent of the students to participate in the research. At the time of the research, all participants had no signs of any diseases and were considered relatively healthy.

The questionnaire of state anxiety (SA) and trait anxiety (TA) by C.D. Spielberger in adaptation of Y.L.Hanin (1976) was used to assess the mental and emotional condition of the person. As a functional test for the assessment of physical activity Harvard step test (HST), conducted by standard method (Dubrovsky V.I., 2002) was used [1, 5]. The indicators of respiratory rate (RR per minute), heart rate (HR, beats / min), systolic blood pressure (SBP, mmHg) and diastolic (DBP mmHg), pulse (PAD mm Hg .st.), mean dynamic (FBC mm Hg) at rest and after exercise were studied. Also Kerdo vegetative index (VIK, c.u) was used to assess vegetative tonus. Condition of the autonomic nervous system was determined on the basis of cardio-rhythm studies using diagnostic system “Valenta” (10 minutes record).

Statistical analysis of the material was performed by using IBM SPSS STATISTICS 22 package.

## RESULTS AND DISCUSSION

The main and control groups were formed by anthropometric parameters, the main indicators of the cardiovascular system and respiratory rate were practically identical. At the same time, results in heart rate and FIV indicators suggested a displace of the representatives of the principal balance of the group towards the activation of the sympathetic part of the autonomic nervous system. Due to the fact that the cardiovascular system is an indicator of adaptive reactions of the whole organism [1], the detected changes can be regarded as a reflection of adaptation processes to the new climate and the learning process occurring in students from countries with the hot climate.

Some features of adaptive reactions taking place can be seen in the figures obtained state anxiety and trait anxiety among foreign students. If the groups did not differ in the level of state anxiety, the performance level of trait anxiety of the main group were significantly higher, not only compared to the control, but also with the available scientific data in the literature [8, 9]. This allows us to interpret the level of personal anxiety core group of students as high. When calculating the coefficients for indicators of state and trait anxiety by Spearman rank correlation (r) we‘ve got opposite results. May be it is possibly because of age-related psycho-emotional characteristics of the individuals. Students of the main group showed the moderate and high levels of trait anxiety, no one with the low levels. 35.7% of high level of trait anxiety among foreign students indicates the presence of their expression of emotional stress. However, they do not tend to take most of the situations as threatening and respond to the alarm condition. Results of the control group, the distribution of the first-year students by level of state anxiety and trait anxiety is different from the literature data, according to which most students have a domination of high- and moderate-anxiety (93.3%) and low- and moderate-anxiety (93.3%) respectively. At the same time the prevailing in the first case are high-anxiety (53.3%), in the second - low-anxiety (66.7%) first-year