HAART regimens, immunosuppression levels, and opportunistic infection-caused brain lesions. The results were treated using statistical procedures available in MS Excel.

Results: The average age of HIV patients was 36±13 years, the average duration of infection 8±8 years. In total 91 patients received HAART without consideration of breaks and duration of therapy. The mean blood CD4 cell count and viral load were 270 mL^{-1} and 224837RNA copies per 1 mL, respectively. 65 patients were found to have MRI-visualized brain lesions corresponding to HIV-associated encephalopathy and 38 patients showed opportunistic brain lesions. No HAART was associated with more severe brain lesions, including gliosis, demyelination, granulematous inflammation. The prevalence of such opportunistic infections as toxoplasmosis and cryptococcosis was high.

Conclusions: Structural changes in the brain visualized with MRI are frequent manifestations of opportunistic infections in HIV patients. The course, localization and severity of the changes depend on immunosuppression and viral load. The early start of HAART may contribute to prevention of the brain involvement in HIV. Clinical and radiological comparisons of HIV patients suggest that MRI is indispensable for clinic-diagnostic examination of HIV patients.

Cytomedalovirus as an atherosclerosis progression factor in HIV-infected and HIV-uninfected patients

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Background: due to wide-spreading of combination antiretroviral therapy (cART), life expectancy of HIV-infected patients is steadily increasing, and the major causes of death in HIV-infected patients are non-AIDS related. One of the leading causes of death in these patients is now the early development of cardiovascular disease (Miller et al., 2014). High risk of development of cardiovascular diseases in HIV-infected patients is associated with chronic immune activation, which could lead to atherosclerosis progression (Nou et al., 2016). The cause of this immune activation remain unclear. It is possible, that other virus co-infection could trigger such activation. Cytomegalovirus infection (CMV) is one of the most common infections among HIV-infected patients. CMV is associated with the chronic immune and inflammatory diseases, with development and progression of atherosclerosis and high risk of complications, such as acute myocardial infarction (Nieto et al., 1996, Blum et al., 1998, Gattone et al., 2001). The study, performed in our laboratory, had shown a positive correlation between CMV replication and acute coronary syndrome. However, the causal relationship of these facts has not been proven. Suppressed HIV infection followed, however, CMV infection, represents a native model for studying the connection between cardiovascular disease and CMV.

Objective: to determine the influence of cytomegalovirus infection on the progression of atherosclerosis in HIV-infected patients.

Materials and methods: 1. Materials: blood and atherosclerotic plaques samples of HIV-infected patients after a long period of successful therapy. Samples will be obtained from the Moscow AIDS center. *2. Methods:* real-time PCR, flow cytometry, electron microscopy will be used in this study for DNA, RNA and CMV proteins detection in blood plasma, red blood cells and vascular walls, affected with atherosclerosis.

Expected results: a study of HIV-infected patients allows to identify cohorts of CMV-negative individuals, and individuals with high and low CMV level. The majority of HIV-infected patients are people of middle and young age, so we could exclude the age as a risk factor of atherosclerosis, what is impossible in general population. Our research data, submitted for publication, suggests an important role of CMV in the development of atherosclerosis in HIV-negative patients with atherosclerosis. The study of this effect in HIV-infected patients, where the processes of atherosclerotic changes are significantly accelerated, will allow to determine the connection between CMV and cardiovascular diseases.

Conclusion: the successfully treated HIV infection, nevertheless leading to the early development of cardiovascular diseases, is a promising model to elucidate the role of CMV in this process. The results of this study may lead to new treatment strategies as in HIV-infected patients, as in the general population.

Cognitive impairment and its correlations with mental disorders in HIV-infected patients with early syphilis

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The objective of the study was to determine the correlations between cognitive impairment in HIV-infected patients with early syphilis and mental disorders.

Method. 65 HIV-infected patients with early syphilis were examined by a clinical method. Cognitive impairment was assessed by means of BNCE test.

Results. The sample included 45 men (average age 32,09±9,83) and 20 women (average age 31,7±5,97). Mental disorders were identified in most patients (83%). We revealed a high incidence of addictions (46,2%). Opiate dependence (F11, ICD-10) was established in 18,5% of patients. The dependence on multiple drug use (F19; including opiate dependence in all cases) was revealed in 13,8% of patients. The dependence on stimulants (F15) and the dependence on alcohol (F10) were found in 4,6% and 32,3% of pati-

ents respectively. 20% of women had Depressive episode (F32). Adjustment disorders (F43) were found in 32,3% of patients. Personality disorders (F60) and mental disorders due to brain damage (F06) were found in 15,4% and 13,9% of patients respectively. Cognitive impairment was found in 43,1% of patients and was characterized by mild cognitive disorders (asymptomatic neurocognitive impairment in Antinori A. [et al.] classification). Patients with cognitive impairment were characterized by visuospatial agnosia, visuomotor memory and coordination impairment, intellectual impairment with the decline in abstraction ability.

No difference in the level of cognitive impairment between HIV-infected patients with early syphilis and HIV-infected patients with early neurosyphilis was identified. The presence of cognitive impairment was significantly associated with lower counts of CD-4 lymphocytes in the blood (343,53±223,93 and 506,38±221,96; p=0,038; R=-0,36, p=0,031). The severity of HIVassociated neurocognitive disorders (HAND), according to the BNCE test results, was linked to the following factors: hepatitis C coinfection (R=-0,38, p=0,003), substance abuse (R=-0,39, p=0,002) and intravenous drug use (R=-0,51, p<0,0001). Correlations between HAND and brain injuries, stage of HIV infection, time elapsed after being infected and viral load in the blood were not identified. Cognitive impairment in patients without mental disorders was found significantly less frequently (R=0,58; p<0,001). HAND were associated with mental disorders due to brain damage (R=-0,93; p<0,0001), dependence on stimulants (R=-0,69; p=0,014), opiate dependence (R=-0,48; p<0,001), and dependence on alcohol (R=-0,28; p=0,037). Patients with adjustment disorders were less likely to suffer from cognitive impairment (R=0,27; p=0,047). Social adaptation of patients with HAND was often assessed as low (R=0,47, p<0,001).

Conclusions. Cognitive impairment occurs in 43% of HIV-infected patients with early syphilis; it is more common in patients with comorbid mental disorders (mental disorders due to brain damage and addictive disorders) and affects their social adaptation. Its manifestations include visuospatial agnosia, intellectual impairment and visuomotor memory and coordination impairment. Early neurosyphilis has no effect on clinical manifestations of HAND.

Developing a technology for the early diagnostics of bacterial and fungal opportunistic infections in HIV patients

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This report presents the results the study looked into 66 patients who were hospitalized in the Infectious Disease Department with diagnosed HIV-infection in stages 2B and further. The control group comprised 33 people who were examined and divided into health groups I and II. Microorganisms were identified by means of standard methods: bacterial swab test with application of selective growth medium, as well as using sensitivity of a given isolates to oxacillin, optochin, or bilis. Serotype *Streptococcus pneumoniae* was identified and defined by way of multiplex PCR. Microorganisms were isolated from swabs taken in the throat and nose, sputum, pleural fluid and blood.

Microflora of upper respiratory airways in the main group was represented by the following isolates: fungi *Candida; Staphylococcus epidermidis* and *Streptococcus mitis/oralis; Staphylococcus aureus*, including MRSA (45% of patients); *S. pneumoniae, Haemophilus spp, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa*. The composition of fungi Candida was represented by 4 species: the proportion of Candida albicans, Candida tropicalis, Candida glabrata and Candida krusei. According to the PCR tests, the main serotypes are 6ABC, and representatives of serotype 10A.

In the control group, gram-positive cocci prevailed: *Staphylococcus hominis, Micrococcus spp, S. aureus, Staphylococcus epidermidis*. Fungi *Candida, Proteus mirabilis, K. pneumoniae* and *Acinetobacter spp*.

The fact that the mucous membranes of the upper respiratory airways are colonized by flora of bacterial in HIV-positive patients can facilitate diseases caused by these microorganisms, therefore, such patients require routine observation, prescription of ART and taking antibacterial preventive measures against opportunistic infections already at the latent stage of the disease. HIV-positive patients shall have early specialized preventive treatment for the mentioned infections (vaccination).

Skin explant model for optimization of delivery of genetic vaccines and gene-based drugs

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Background: Electroporation (EP) is one of the most efficient approaches when in comes to intradermal gene delivery. The method has been known to enhance gene delivery and subsequent in vivo expression by 100–1000 fold, and is considered as crucial technique for delivery of therapeutic genes including CRISP gene editing. Today, there is also a definitive evidence showing increased efficacy of gene immunization as compared to classical vaccine techniques. The efficacy of this technology in large animals is secured by electroporation-mediated gene delivery. Technologies and methods for gene delivery have been rapidly developing in the past few