

should be used to solve the tasks of characterization and conceptual analysis of meta-data on the “HIV-host” interaction system. The multiscale mathematical modeling methods may help in the studies focused on the sensitivity of viral infection “stabilization points” towards virus replication and immune reactions in the acute phases of infection. Moreover, these methods are necessary for the estimation of prolonged ongoing immune stimulation effects, the degree of damage to microenvironment and tissue structures of lymph nodes, and the decrease in proliferative potential and the pool of central CD4⁺ T-cells.

Lastly, the special emphasis is given to the theoretical analysis of HIV relationships with macroorganism, taking into account the virus evolution in the conditions of lymphocytes and macrophages phenotype changes during the adaptive reconstruction of the immune system.

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CHALLENGES AND PERSPECTIVES IN HEPATITIS C VIRUS (HCV) RESEARCH IN AN ERA OF DIRECT ACTING ANTIVIRAL (DAA) THERAPY

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Elaboration of *in vitro* models enabled studies of the HCV life cycle and a search of inhibitors of viral replication, leading to the development of effective DAA targeting non-structural proteins involved in virus replication (NS3/NS4A protease, NS5B polymerase and NS5 inhibitors) with cure rates of more than 95%. Despite this outstanding success of modern medicine and substantial progress in our knowledge of the virus, infection control might be only effective when antiviral therapy and vaccination are combined, since individuals that have been cured with DAAs remain susceptible to reinfection. Another limitation of DAA is their low genetic barrier, resulting in the emergence of drug escape-variants. Alternative or complementary approaches have been thus considered to target host factors required for accomplishment of the virus life cycle: cell entry, assembly or release, related to lipoprotein metabolic pathways. Such drugs would have high genetic barrier and pan-genotypic activity.

HCV represents a difficult target for vaccination due to its considerable variability (7 genotypes, 67 subtypes and genetically diverse “quasispecies”). Continuous mutations result in changes in E1E2 envelope glycoproteins targeted by neutralising antibodies and help HCV to evade humoral immunity. The structure of HCV particles circulating in the blood of infected patients remains elusive due to their association with very low-density lipoproteins (lipo-viro-particles). Moreover their size and composition evolve during infection. Shielding of the envelope epitopes by lipoproteins and glycoproteins, cell-to-cell virus spread, and its dissemination by exosomes represent important escape mechanisms that contribute to propensity of HCV to establish chronic infection.

The development of HCV vaccine requires better understanding how antibodies interfere with the virus and of the mechanisms of CD4 T helper cell failure during infection, a predictor of progression to chronicity. An HCV vaccine eliciting T cell responses rather than neutralising antibodies is considered and is currently in clinical testing. Notably, the goal of vaccination is a partially protective vaccine, able to prevent development of persistence, not necessarily infection. A vaccine might be equally needed to restore immune dysfunction of cured patients to prevent re-infection. The development of permissive and immunocompetent animal model(s) is required for further studies of HCV vaccines and HCV-related pathogenesis.

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FREQUENCY AND THE CLINICAL SIGNIFICANCE OF OCCULT HEPATITIS B VIRUS INFECTION

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The detection of hepatitis B virus surface antigen (HBsAg) in serum remains the mainstay in the diagnosis of chronic hepatitis B viral infection and screening for hepatitis B virus in most developing countries, include Russia. Symptoms in chronic hepatitis B viral infection may range from mild nonspecific symptoms in patients with minimal liver damage to ascites, peripheral edema, and encephalopathy in patients with advanced liver disease. Anti-HBc may be the sole marker of resolved hepatitis B viral infection, as anti-HBs, which is neutralizing and so appears after the clearance of HBsAg, may disappear from serum many years after the resolution of hepatitis B viral infection. Occult hepatitis B viral infection is characterized by the absence of detectable HBsAg and presence of HBcAb. The objective of study was to identify cases of occult hepatitis B viral infection from patients diagnosed with chronic viral hepatitis and determine its clinical significance.

2236 adult patients with chronic B virus infection were enrolled in study. Serological markers for hepatitis B virus were determined with immunoenzymatic assay and viral DNA — by polymerase chain reaction. For assessment of liver fibrosis was used transient elastography.

Out of all, 42.2% patients had tested negative for the HBsAg and positive HBcAb serologic marker. HBsAb (more 10 IU/l) were detected in 28.1% occult hepatitis B. DNA of virus in blood was detected by polymerase chain reaction (threshold 100 IU/l) in 4.3%. In case of using the sensitive test system (threshold 10 IU/l) DNA was detected in 100%. ALT levels were different: N — in 21.8% patients, 1–2N — 41.7%, 2–5N — 27.0%, more 5N — 9.5%. The severe staging of liver fibrosis (F3–F4) is established in 55.5% (F3 — in 3, 6%, F4 — in 51.8%). The moderate staging of liver fibrosis (F1–F2) was 44.5% (F1 — 15.5%, F2 — 29.1%). The severity of chronic liver disease in terms of Child–Pugh score was: class A — 6.3%, class B — 15.5%, class C — 78.2% ($p < 0.001$). Mortality in the cohort of patients with occult hepatitis B virus infection was 13.2% and among patients with cirrhosis — 25.5%. Hepatocellular carcinoma was diagnosed among patients with liver cirrhosis in 1.8%.

The long-term persistence of the virus in the liver may induce a very mild but continuing necroinflammation that — if other causes of liver injury co-exist — may favor the progression of the chronic liver disease toward cirrhosis.

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HEPATITIS A PREVALENCE AMONG CHILDREN IN BOKE AND KINDIA PROVINCES (REPUBLIC OF GUINEA)

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There are no reliable statistical data on the hepatitis A reported cases number among the Republic of Guinea population, included children. One of the morbidity estimation method is the antibodies to hepatitis A virus prevalence estimation in different age groups. Aim of study: to estimate