VV-1302-004
Problems of Diagnosis of the Hepatitis B Virus
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Abstract. The recent data on the genetic variability of the hepatitis B virus and problems of serological ELISA-mediated detection of this virus are discussed.
Key words: hepatitis B virus, ELISA, HBsAg, a-determinant, main hydrophilic region, amino acid substitutions

VV-1302-010
Virus-Like Particles – A New Strategy for Production of Vaccines against Influenza Virus
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Abstract. Numerous studies demonstrated that simultaneous expression of some viral proteins in the cell with the aid of a process of self-assembly might lead to the formation of the virus-like particles (VLP) even in the absence of the viral genome. The morphological and antigenic similarity between VLP and native virions represents a promising approach to the new type of vaccines. In the last decade, the threat of the influenza strains with pandemic potential becomes more important. Therefore, the technology for obtaining a new generation of safe and effective non-embryo culture vaccines was developed on the basis of the influenza VLP produced in various expression systems. This provides great advantages in comparison with existing methods of vaccine production. Such vaccines induced full humoral and cellular immune response in animals and humans. This review is focused on the literature concerning the influenza VLPs obtained in various expression systems including insect, mammalian and plant cells.
Key words: influenza, virus-like particles, vaccine, expression system

VV-1302-015
Development of the Influenza Epidemic in Season 2011-2012 in Some Areas of Russia: Results of Activity of the Influenza Etiology and Epidemiology Center of the Ivanovsky Institute of Virology
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Abstract. The results of analysis of the peculiarities of the epidemic 2011-2012 development in the areas of 10 cities of Russia obtained by basic laboratories of IEES on the base of D.I. Ivanovsky Research Institute of Virology, Ministry of Public Health and Social Development of Russia, are presented. The increasing ARD morbidity caused by the influenza viruses was detected rather late – in February-March 2012. The highest indices of the morbidity were detected during weeks 10-13 followed by decreasing to threshold levels by week 27. Children 0-2 and 3-6 years old were involved the most, meantime the high rate of hospitalization was found for 15-64 years old aged group (25%). Influenza A(H3N2) and B viruses were the cause of the epidemic. The results of studies of the antigenic and genetic properties of the influenza strains showed most of them to be close relatives to the vaccine strains. Some heterogeneity of circulating strains and their drift variants were found as well. All tested strains were sensitive to arbidol, oseltamivir and zanamivir, and saved resistance to rimantadine. The ratio of ARD viruses was comparable with the last epidemic seasons.
Key words: IEEC, epidemic season 2011-2012, strains of influenza viruses, antigenic properties, genetic properties, susceptibility to antivirals

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Comparative Analysis of the Immune Response to DNA Constructions Encoding Hepatitis C Virus Nonstructural Proteins
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Abstract. The recent data on the genetic variability of the hepatitis B virus and problems of serological ELISA-mediated detection of this virus are discussed.
Key words: hepatitis B virus, ELISA, HBsAg, a-determinant, main hydrophilic region, amino acid substitutions

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Abstract. The recent data on the genetic variability of the hepatitis B virus and problems of serological ELISA-mediated detection of this virus are discussed.
Key words: hepatitis B virus, ELISA, HBsAg, a-determinant, main hydrophilic region, amino acid substitutions
Abstract. A promising approach to construction of antiviral vaccines consists in activation of cellular immunity with the DNA vaccines. The goal of this work was to evaluate the efficacy of genetic immunization of mice with DNA pcNS3-NS5B encoding five hepatitis C virus (HCV) nonstructural proteins: NS3, NS4A, NS4B, NS5A, and NS5B in comparison with plasmids containing genes of same individual nonstructural proteins. The DNA constructions were injected intramuscularly in DBA mice three times. The humoral immune response was assessed with ELISA; cellular immune response – in blast transformation reaction, by quantitation of CD4+ and CD8+ T cell proliferation using flow cytofluorometry, by intracellular synthesis and secretion of IFN-γ and IL-2 in ELISpot and ELISA. It was found that the functionally active T cell response was achieved to antigens presenting NS3, NS4, NS5A, and NS5B epitopes of different HCV genotypes in response to pcNS3-NS5B plasmid and was stronger than that to plasmids carrying individual genes. A high proliferation rate of CD4+ T cells, secretion of IL-2 and IFN-γ, induction of anti-NS3 and anti-NS5B IgG2a were demonstrated. These findings indicate that DNA construction pcNS3-NS5B is one of promising candidates for anti-HCV vaccine developing.

Key words: hepatitis C virus (HCV), nonstructural proteins, DNA immunization, immune response

Prevalence, Features of Circulation, and Diversity of Human Parechoviruses in Nizhny Novgorod

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Abstract. A total of 5230 specimens from children with gastroenteritis collected in Nizhny Novgorod in 2006-2010 were screened for human parechoviruses (HPeV). HPeV were observed every year with mean frequency of 6.16%. The majority of HpeV (65.83%) was detected in children younger than 3 years. The typing of 71 detected HPeV with the use of partial sequencing of the VP3-VP1 region revealed the presence of HPeV1 (91.55%), HpeV6 (5.63%), HPeV3 (3.08%), HPeV4 (1.54%). HPeV1B was predominant among HPeV1, HPeV1A was identified rarely. Six stains of HPEV1 formed separate phylogenetic cluster, had sequence gomology with HP EV1A or HPeV1B not more than 88% and could be characterized as members of a separate genotype HPeV1.

Key words: human parechoviruses, prevalence, genotype of human parechoviruses

Tick-borne Encephalitis with Fulminant Course and Lethal Outcome in Patients after Plural Vaccination

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Abstract. In the Kurgan region, the Siberian subtype of the tick-borne encephalitis virus (TBEV) is dominant. The vaccines prepared from Far-Eastern TBEV subtype are used in this area. Among TBE patients in 2007-2011, 23.79% were vaccinated according to complete or incomplete course. 76.9% of persons were vaccinated with Encevir vaccine, Tomsk. An unusual focal form of TBE with fulminant disease with lethal outcome was developed in a patient who was vaccinated 6 times with heterotype vaccines produced using the strains of the Far-Eastern TBE subtype. Inoculation of immunoglobulin in hospital produced aggravation of clinical symptoms, development of convulsions, brain oedema, and respiratory distress syndrome. The disease continues only 55 hours from first symptoms to fatal outcome. Siberian subtype of TBEV was isolated from patient spinal cord (Kurgan-118-2010 strain). Possible mechanisms of this disease are discussed.

Key words: Fatal TBE case, Siberian subtype, plural vaccination

Humoral and Cell-mediated Immune Responses in Humans to the A/California/07/2009 (H1N1) Virus, A(H1N1)pdm2009


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**Abstract.** During the twentieth century the world faced four influenza A pandemics: A (H1N1) in 1918, A (H2N2) in 1957, A (H3N2) in 1957 and A (H1N1) recirculation in 1977. In the beginning of 2009 the global spread of A(H1N1)pdm2009 virus was detected. In consideration of clinical evidences and genetic data analysis WHO declared as the novel pandemic of 21st century. However, the fact of exceedingly prolonged previous worldwide circulation of A (H1N1) influenza viruses was not taken into account. Further development showed epidemiological prognosis not to be accurate enough. The present work is an attempt to analyze this question from the immunological standpoint based on our studies of antibody and cellular immunity to A(H1N1)pdm2009 virus in vaccinated and non-vaccinated persons of different ages. The study results allow concluding that A(H1N1)pdm2009 is the drift variant of A (H1N1) viruses antigenically close to A/Swine/1976/1931 (H1N1). It was shown that the significant of persons have cross-reactive B and T cell immunological memory to A(H1N1)pdm2009 strain. This could be a reason of decreased A(H1N1)pdm2009 pandemic severity.

**Key words:** anti-influenza immunity, immunity to influenza A strains, cell-mediated immune response

**VV-1302-043**

**Development of Diagnostic Test System Based on Fluorescent Polarization Immunoassay Method for Detection of Antibodies to HCV Nucleocapsid Protein**

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**Abstract.** The antigen activity of the synthetic fluorescently labeled peptides, overlapping immunoresponsive epitopes a.a. 7-19, 20-34 from N-end part and a.a. 73-85 from the central area of the nucleocapsid protein of C hepatitis virus, was tested using the method of fluorescent polarization immunoassay (FPIA) with 40 samples of the blood serum of patients with viral C hepatitis. A comparative study of analytic characteristics of FPIA method was performed, based on the application of synthesized peptides, as well as of the commercial ELISA test system (BEST anti-HCV-test 4, Vector Best Ltd.). The performed research revealed that the developed method has a high specificity and sensitivity level. The comparability of summary FPIA results with the commercial ELISA test system was 85%, which evidences the prospects of further research in this direction. The principal possibility of the application of the polarization fluorescent immunoassay for the determination of antibodies to the nucleocapsid protein of the C hepatitis virus in clinical serum samples was demonstrated.

**Key words:** HCV virus, HCV nucleocapsid protein, epitopes, synthetics peptides, fluorescent polarization immunoassay