The content of the training programs based on advanced university studies Virology

Head of discipline: Prof. Dr. Simona Ruta

1. Structure of viruses. Viral replicative cycle

2. Virological diagnostic algorithm: The stages of isolation and identification of viruses from sick patients. Sampling, transport, processing of pathological products. Methods of storage of viral strains Isolation of their viruses on cell cultures. Main types of cytopathic effects. Viral infectivity titration

3. Pathogenesis of viral infection; viral persistence.

4. Immunity in viruses: The non-specific and specific humoral immune response. Interferons: mechanisms of action and biological effects. B lymphocytes, the role of antibodies in the defense against viruses. Cellular immune response. The role of the major histocompatibility complex. Viral strategies to escape the immune response

5. Viral vaccines. Inactivated vaccines, live attenuated vaccines, modern alternatives for obtaining vaccines; mRNA technology, vector or non-replicative or defective viruses. Advantages and disadvantages of the national calendar of vaccinations in Romania.

6. Orthomyxoviruses: influenza viruses; Variability of influenza viruses. Shift and antigenic drift pandemic strains and epidemic strains. Vaccines in the prevention of influenza. Medicines with anti-influenza action, mechanism of action. Laboratory diagnosis in virus infection respiratory. Rapid diagnosis in flu.

7. Paramyxoviruses: Respiratory syncytial, whooping, measles viruses as structural and pathogenic. Live attenuated vaccines (anti-measles, anti-mumps, Laboratory diagnosis in eruptive viruses

8. Herpesviridae: HSV 1 and 2, VZ, EBV and CMV viruses; Human herpes viruses 6, 7 and 8. Peculiarities of the viral replicative cycle. Mechanisms involved in latency. Laboratory diagnosis of alpha herpesvirus infections. Laboratory diagnosis in CMV infection and other viruses with maternal-fetal transmission. Specific antivirals for some herpesviruses, mechanism of action. Vaccination against varicella and zoster virus

9. Neuroviruses. The main families of viruses involved in the etiology of meningitis, meningoencephalitis and viral encephalitis. Peculiarities of enteroviruses. Laboratory diagnosis in viral meningitis. Virus neutralization reaction. Chess board technique.

Characteristics of arboviruses. West Nile meningoencephalitis epidemic in Romania. The rabies virus, particularities in the pathogenesis of rabies. Prophylaxis of rabies virus infection.

Diagnosis in rabies. Persistent infection with measles virus Subacute sclerosing panencephalitis (PESS).

10. Retroviridae: onco and lentiviruses. Structure of HIV. HIV replicative features. Viral and cellular factors that influence replication Target cells. Receptors and co-receptors. Ways of transmission and risk groups. The pathogenesis and evolution of HIV/AIDS infection. Mechanisms of action

of antiretrovirals. Reverse transcriptase inhibitors; viral protease inhibitors; Adsorption and fusion inhibitors. Inhibitors of viral integrase. Mechanisms of antiretroviral resistance. Virological methods for monitoring the effectiveness of antiretroviral treatment

Prevention of maternal-fetal transmission. Methods of pre-exposure prophylaxis. Laboratory diagnosis in HIV/AIDS infection. Detection of infection in newborns from seropositive mothers.

11. Hepatitis viruses with enteric transmission VHA, HEV Structure and replicative features. Vaccination against hepatitis A

12. Hepatitis viruses with predominantly parenteral transmission. Etiological agents. HBV, HDV, HCV. Structure and replicative features. Notions of haemovigilance. Hepatitis B vaccination. Chronic hepatitis with viruses B, C, D. The main mechanisms involved in chronicity. Antiviral drugs active on HBV. Coinfection and superinfection with VHD. Antiviral drugs active on HCV. Principles of treatment in chronic hepatitis B and C. Laboratory diagnosis of acute and chronic viral hepatitis. Genotyping. Markers for virological monitoring of the evolution and treatment of chronic hepatitis.

13. Human papillomaviruses. Replicative features. Lytic infection versus persistent infection. Genotypes with high oncogenic risk. The involvement of human papillomaviruses in human cancers in the genital and oropharyngeal sphere; Vaccination against papillomaviruses.

14. Viruses and cancer are oncogenes and anti-oncogenes. Oncogenesis with DNA viruses (gamma herpesviruses, papovaviruses, Oncogenesis with RNA viruses (oncogenic retroviruses) Characteristics of transformed cells. Possibilities of vaccination in cancers of viral etiology

15. Highly pathogenic coronaviruses: SARS CoV; MERS CoV, SARS CoV-2. Structural and replicative peculiarities. Pathogenesis. Therapeutic options. SARS CoV-2 vaccines.

16. Emerging viruses. New pathogenic arboviruses - V Zika. Filoviruses: V Ebola. V. Marburg. New neurotropic paramyxoviruses. General characteristics, clinical syndromes, epidemiology elements. Diagnostic algorithm in epidemics/pandemics with initially unknown etiology