The schedule of virology course 3rd year MG

1. **Generalities on viruses**, Viral taxonomy; The main families of medical interest; The structure of the viruses. **Viral replication cycle**; The pathogenesis of viral infection; Viral persistence.

2**. Immunity in virosis**: nonspecific and specific humoral immune response. Interferons: mechanisms of action and biological effects; the role of antibodies in protection against viral diseases. Cellular immune response; The role of the major histocompatibility complex. Viral strategies to elude the immune response. Inactivated vaccines, live attenuated vaccines, modern alternatives for obtaining vaccines.

3. **Neurovirosis.** The main virus families involved in the etiology of meningitis, viral encephalitis, and meningoencephalitis. Particularities of enteroviruses. Particularities of arboviruses. The epidemy of West Nile meningoencephalitis in Romania. Rabies-virus particularities in the pathogenesis of rabies, the prophylaxis of the infection with the rabies virus. Diagnosis of rabies. Subacute sclerosing panencephalitis (SSPE).

4. **Herpesviridae**: HSV 1 and 2, VZ, EBV and CMV viruses; Human herpes viruses 6, 7 and 8. Particularities of a viral replicative cycle. Mechanisms involved in latency. Herpesviruses - specific antiviral mechanism of action. Varicella zoster anti-virus vaccination.

5**. Orthomyxoviruses**: influenza viruses; Variability of influenza viruses. Antigenic - shift and drift pandemic strains and epidemic strains. Prophylaxis of influenza vaccines. Anti-influenza drugs. Paramyxoviruses: Respiratory syncytial viruses, mumps, and measles - structural and pathogenic particularities. Live attenuated vaccines (mumps, measles, and rubella) ??

6. **The HIV / AIDS infection** (I); Retroviridae: onco and lentiviruses. The structure of the HIV virus. Replicative cycle. Cell receptors and coreceptors. Routes of transmission and risk groups. Pathogenesis.

7. **The HIV / AIDS infection** (II). Evolution and monitoring of HIV / AIDS. Antiretroviral treatment. The mechanism of action of antiretrovirals. Reverse transcriptase inhibitors; inhibitors of the viral protease; Adsorption inhibitors (antagonists of CCR5 coreceptors) and fusion. Viral integrase inhibitors. Divergent high-efficiency polytherapy. Mechanisms of resistance to antiretrovirals. Preventing the Maternal-Fetal transmission . Pre-exposure prophylaxis ways.

8**. Hepatitis viruses**: Hepatitis A, B, C, Delta, E; recently identified hepatitis viruses. Etiologic agents. Structure and replication features. Concepts about haemovigilance. Laboratory diagnosis of acute viral hepatitis. Vaccination against hepatitis A and B.

9. **Chronic hepatitis** with viruses B and C. The main mechanisms involved in chronicity. Chronic hepatitis B treatment. Chronic hepatitis C treatment. Antiviral drugs with direct action (inhibitors of protease NS3 / NS4A, inhibitors of viral polymerase NS5B, inhibitors NS5a). New active drugs in chronic VHC infection. Markers for virological monitoring of the evolution and treatment of chronic hepatitis. Primitive liver carcinoma.

10. **Human papillomaviruses**. Lytic infection versus persistent infection. High oncogenic risk genotypes. The involvement of human papillomaviruses in cervical carcinoma; Antipapilomaviruses vaccination.

11**. Viruses and cancers**. Anti-oncogenes and oncogenes. Oncogenesis with DNA viruses (gammaherpesviruses, papovaviruses, hepadnaviruses) .Oncogenesis with RNA viruses (oncogene retroviruses). Characters of transformed cells. Possibilities of vaccination in cancers with viral etiology.

12.**Emerging virosis**. Developing mechanisms. New neurotropic viruses. New human coronaviruses: SARS, MERS. Viral haemorrhagic fevers. Ebola, Marburg clinical syndromes, elements of epidemiology.

Practical works:

1. **Algorithm of the operations involved in virological diagnosis**: Steps of isolating and identifying viruses from afflicted; Sampling, transport, processing pathological products. Storing viral strains. Labeling and evidence of samples.

2. **Viral isolation**. **Cell Cultures**: Classification. Protocol for obtaining stationary cell cultures; Virus isolation in cell culture. The main types of cytopathic effect. Titration of viral infectivity.

3. **Laboratory diagnosis in neurovirosis**. Virus-neutralization reaction. Chessboard technique.

4. **Laboratory diagnosis of herpesviruses infections**: viral isolation methods. Highlighting the virus directly from the pathological product. Immunofluorescence reaction. Laboratory diagnostic in CMV infection and other virosis with a Maternal-Fetal transmission.

5**. Laboratory diagnostic of infection with influenza viruses**. Hemagglutination and hemagglutination. Rapid diagnosis of flu - immunofluorescence reaction.

6. **Laboratory diagnosis of HIV / AIDS infection**: sorting and confirmation techniques: ELISA, Western Blot (WB). Detection techniques of a virus and viral products. Gene amplification methods (PCR, RT-PCR, real-time PCR); Serological detection of infection during the window; Detecting the infection in infants with seropositive mothers. Determination of viral load and treatment monitoring.

7. **Laboratory diagnosis of viral hepatitis** with an enteric and parenteral transmission. Hepatitis B diagnostic algorithm, highlighting methods of HBsAg, HBV Markers of infectivity; Molecular diagnosis of HBV infection. Diagnosis of hepatitis D.

8. **Diagnosis of hepatitis C**. Serological tests: immunoassay - ELISA, RIBA confirmatory tests, Western Blot. HCV infection in molecular diagnostics. Genotyping.

9. **Molecular diagnosis of HPV infection**. Determination of high oncogenic risk genotypes. Case report: HIV-HPV

10. **Diagnosis algorithm in outbreaks with initial unknown viral etiology**. Possible etiologic agents. Sampling, transport, processing pathological products. Labeling and obvious, choosing diagnostic directions. Viral isolation and identification.

Bibliography:

1. "Virusologie Medicala"- C. Cernescu, Ed. Medicala, 2012, 2008, chapters -1, 3, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 18, 20, 21, 22, 23, 25, 26, 28, 33, 34.

2. ."Curs Concis de Virusologie", C. Cernescu, S. Ruta ,Ed. Medicala, 2002

3. "Practica diagnosticului virusologic", C. Cernescu, S. Ruta, Ed. Concept publishing, 1997 cap 1, 2, 3, 4, 5, 6, 7, 8 , 9, 10, 11, 12.

5. "Medicamente antivirale"- S. Ruta, C. Cernescu, Editura Universitara "Carol Davila", 2003

6. "Progrese in controlul si prevenirea virozelor cu potential bioterorist" S. Ruta, C. Cernescu, Editura Universitara "Carol Davila", 2004

7. "Fields Virology", Fifth Edition – David Knipe at al., W. K., L.W.W., 2007

**Evaluation**

During the semester:

a. Two tests

b. Presentation of clinical cases and discussing the virology diagnostic and treatment monitoring issues

c. Oral Assessment during the practical works.

Session: Written exam from the course material and LP at the end of the semester (multiple choice questions and clinical case type topics).