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COMPLEX ANALYSIS OF BIOLOGIC PROPERTIES OF INFLUENZA VIRUSES ISOLATED IN VARNA DISTRICT

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Influenza is still one major infectious disease with global distribution. Most important question is to study biologic and antigenic variability of type A Influenza virus, especially in regard to viral antigenic unstability. Our present study covers results of biologic properties and antigenic structure of Influenza viruses, type A isolated in Varna District during 1985/1990. A total of 83 haemagglutinating viral agents were isolated during epidemic waves among children, school and factory staff, as well as ambulatory and stationary patients. Experimental model was chicken embryo. The applied tests for biologic and antigenic properties of isolated viruses were: biologic, biochemical and immunologic, used also in our previous studies. The isolated local Influenza viral strains were easy-to-isolate, following about 2-3 passages of chicken embryo experimental model (strains 1985,1988,1990), or difficult-to-isolate, following about 4-5 passages on the same model (1986,1987,1988,1989); all with low primary haemagglutination titres (1:20-1:40). The infectious titres of isolated Influenza viral strains after 3-5 passages were between 5,33 lg LD_{50}/0,2 ml and 8,84 lg LD_{50}/0,2 ml. It was most probably that this property could characterize the intensity and duration of Influenza epidemic wave in Varna District (fig. 1). Our efforts to adapt studied viral strains on monolayer trypsinized cell cultures from kidneys of human and chicken embryos, as well as diploid cells of human lung, up to third passage, were all successless. Majority of examined Influenza viruses type A shew well-expressed haemadsorptive, haemagglutionation and various elutriation activity at 4°C and 37°C. The degree of elutriation was 1:2 to 1:64 from preliminary titres. Strains with pooly expressed elutriation activity were also detected (1985,1986,1987,1988). The isolated Influenza viral strains shew different thermostable properties of haemagglutinins at 56°C. The neuraminidase examinations confirmed its disposition to antigenic subtypes N1 and N2 /85/86 and 87/88/ or only subtype N2 /86/87, 88/89, 89/90/. The viral inhibitors glutathione, L-cystein, Zn^{2+} and EDTA-Na_2 in 0,1 M concentration exerted inhibition of neuraminidase enzyme activity about 45-62% (fig. 2). The circulating in Varna District Influenza viruses type A /H1N1/ and A /H3N2/ were untoxic or

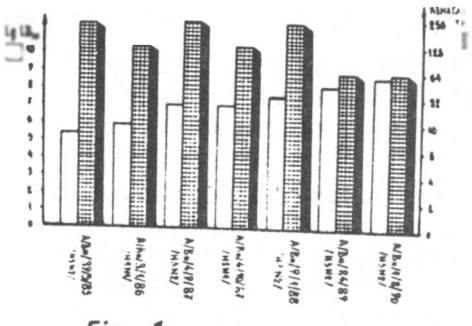

Fig. 1

low-toxic towards same experimental animals (mice, rats, guinea-pigs, cocks). The viruses possessed various inhibitor sensitiveness towards nonspecific inhibitors found in sera of animals and man.

The isolated viruses expressed different pathogenic, infectious and immunogenic activity on experimental model chicken embryos and animals. The immune state of infected with different Influenza viral strains mice was investigated in dynamics (24, 48, 72, 96, 120 h after innoculation). The analysis of the applied tests for cellular, humoral, specific and nonspecific test characterized reliably the dynamic changes of the immune response with a well expressed peak about 48-72 h after infection and subpeaks about 120 h after it. Our model of immunologic monitoring allowed to differentiate various stages of the disease, and what was most essential - to predict phases of acute infection, remission, restoring and curing. The study of antigenic profile of isolated viral strains established the following highest epidemic activity of antigenic variants subtype A/H3N2/: A/Texas /1/77, A/Philippines/2/82, A/Sankt-Peterburg 360/86, A/Sitzuan/2/87, A/Shanghai/11/87. Some cases were registered and identified as antigenic variants of subtypes A/H1N1: A/Brazil/11/78, A/Chile/1/83, A/Swiss /78/85. Our data confirmed that the infectious activity of Influenza viruses in human populations was connected to the appearance of new antigenic variants with changed content of haemagglutinin and neuraminidase, also to the selection of variants with higher potential pathogenicity.

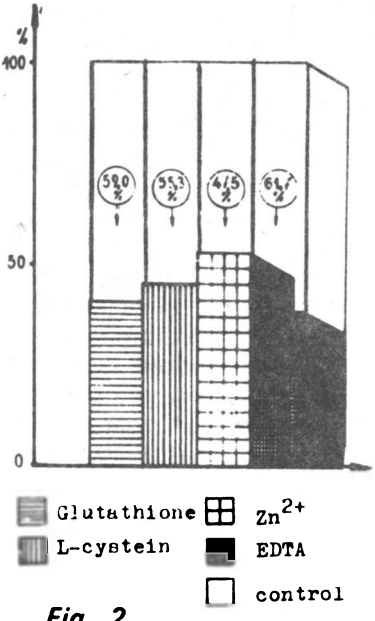

Fig. 2