

BIOLOGIC AND ANTIGENIC CHARACTERISTICS OF INFLUENZA VIRUSES TYPE A ISOLATED IN THE TOWN OF VARNA DURING 1996-1998

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The haemadsorption, haemagglutination, and inhibitor-susceptibility as well as eluent, pathogenic, toxic, and immunogenic activity of 10 isolated influenza type A strains were examined using modern methods for studying their antigenic structure and some biological properties. The investigations showed a continuous active circulation of influenza virus type A with antigenic formula H3N2 similar to that of standard strains A/Beijing/32/92, Johanesburg/33/95, and A/Uhan/359/95 with the corresponding biological properties.

Key words: Influenza virus type A, haemagglutinin, neuraminidase, biology, antigens

The comparative instability of the antigenic structure of influenza virus type A is a typical and unique feature. The issue of resources and mechanisms of origin of new epidemic influenza virus strains is still one of the major primary and actual problems of modern biology and epidemiology of the influenza viruses (2-5). A sequential antigenic variability of influenza viruses during their circulation under natural conditions is admitted. The actual antigenic changes of IV are characterized by different (in degree) modifications in the structure of surface pro-

teins of circulating viruses. These changes, most probably, reflect on the clinico-epidemiologic and immunologic aspects during influenza epidemics (6-9). The present study shows the results of our investigation of the biological characteristics and antigenic structure of influenza virus type A isolated in the town of Varna during 1996-1998.

MATERIAL AND METHODS

Fifteen haemagglutinating viral agents were isolated by using a model of chicken embryos in 1996-1998 of influenza epidemic waves among children, school pupils and other groups of patients, including out-patients and hospitalized ones. The following biologic

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features of 6 from all isolated viruses were studied: ability to be isolated on chicken embryo models, haemagglutinating, eluative, inhibitor-sensitive, toxic, and immunogenic as well as thermostability of haemagglutinin and neuraminidase and antigenic structure of isolated viruses (1,6).

RESULTS AND DISCUSSION

These viruses demonstrate various adaptation and isolation ability on model of 10-12-day old chicken embryos. Data indicate that the influenza virus strains from 1996 have been isolated only after the second-third passage with a haemagglutination titres of 1:32-1:64-1:128, whereas in 1997-1998 they have been adapted and isolated after the first-second passage with a haemagglutination titres of 1:128-1:256 and even 1:1024. The examination of haemadsorption and haemagglutination activity of these strains at +4°C and +20°C demonstrated their ability (to a different degree) to agglutinate human erythrocytes from "O"-group, but also 6 erythrocytes from various animals. The majority of the examined strains showed a well-expressed haemadsorption and haemagglutination activity at both temperatures with the applied erythrocytes. Based on that biologic feature they showed similarity to the standard strains A/Texas/1/77, A/Mississippi/1/85, A/Leningrad/360/80, and A/Sichuan/2/87.

The study of haemagglutinin thermostability of isolated epidemic IV strains indicated a definite tendency towards an increase at 56°C. These isolated influenza virus type A strains demonstrated high and low inhibitor sensitivity. When trying to cultivate the viruses on model chicken embryos at 26°C, 34°C and 40°C the author established the highest haemagglutination titre in viruses cultivated at 34°C followed by those ones at 26°C. The viruses could not be inactivated at 40°C and were reproduced with lower titres, especially those isolated in 1997-1998. The infectious titre of the examined viruses on model chicken embryos were between 3,5 IgLD/0,2 ml and 7,00 IgLD/0,2 ml. When compared to strains isolated in previous years, the infectious titre of the viruses isolated in 1997-1998 were characterized by higher parameters. These viruses were not toxic or with slightly expressed toxic features on experimental mice after intranasal and intraperitoneal inoculation.

The antigenic profile data of the second supercapsid component of the influenza viruses, i. e., the neuraminidase, showed an association to N2 when tested by reaction of delayed neuraminidase activity. The thermal sensitivity of the enzyme in all examined strains was of lower (80-95 %) activity at 56°C and 60°C even after the first 5-10 min. The investigation of antigenic structure of isolated influenza virus strains in 1996-1998 as well as the determination

of their neuraminidase component antigenic profile established an association to the influenza virus type A with antigenic formula A(H3N2). They had antigenic similarity to the standard strains A/Beijing/32/92, A/Johannesburg/33/94, and A/Uhan/359/95.

The present study proved that the intensive circulation of antigenic variants associated to influenza virus type A with antigenic formula H3N2 and corresponding biologic features indicated a continuation in recent years.

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Билогична антигенна характеристика на грипните вируси тип А, изолирани в град Варна през периода 1996 - 1998 г.

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Резюме: С помощта на съвременни методи за изучаване на антигенната структура и някои биологични свойства на 10 от изолираните щамове грипни вируси тип А беше проследена тяхната хемадсорбционна, хемаглутинационна, инхибиторчувствителна, елюираща, патогенна, токсична и имуногенна активност. Проучванията показват, че продължава активната циркулация на грипни вируси тип А с антигенна формула H3N2, имащи антигенно сходство с еталонните щамове А/Бейджинг/32/92, А/Йоханесбург/33/94 и А/Ухан/359/95 със съответните биологични свойства.