

DETERMINATION OF THE ANTIGENIC PROFILE OF THE NEURAMINIDASE COMPONENT OF SOME STANDARD AND LOCAL INFLUENZA VIRUS TYPE A STRAINS ACCORDING TO RIHA

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Key-words: *Influenza virus type A - neuraminidase - RIHA - neuraminidase heterogeneity - antigenic structure*

Relatively unstable antigenic structure of influenza virus type A and its periodical changeability are determined by alterations occurring in the properties of surface antigens - hemagglutinin and neuraminidase. At that hemagglutinin changes more rapidly than neuraminidase [1,7,15].

There exist different hypotheses about the moving forces of influenza virus changeability. Some investigators accept that collective immunity plays an important role [3,6,11]. According to other authors, changeability is due to viral mutations and recombinations occurring in an immune organism [11,15]. Hypothesis that animals and birds present a reservoir of pandemic strains from where the latter disseminate among human population is being more and more often offered [14,15,17].

The object of our investigations is the antigenic profile of N2 neuraminidase of both standard and local influenza virus type A strains with neuraminidase of second sero type (N2).

MATERIAL AND METHODS

The following standard and local influenza virus type A strains of second neuraminidase sero type were used in our study: A/Singapore /1/57 (H2N2); A/Hong Kong /1/68 (H3N2); A/Victoria /35/72 (H3N2); A/Texas /1/77 (H3N2); as well as local strains isolated in our country: A/Sofia /1/57 (H2N2); A/Sofia /142/69 (H3N2) - kindly provided by the Research Institute of Infectious and Parasitic Diseases, Sofia; A/Varna /123/76 (H3N2) and A/Varna /31/84/77 (H3N2) - isolated in the Department of Microbiology and Virology, Higher Institute of Medicine, Varna.

Examined strains are selected with a view to the neuraminidase incorporated in them (N2). They are etiological agents of influenza epidemics during a long period of time - from 1957 till 1984.

Virus-containing allantois cultures passed at least threefold by developing 10-day old chick embryos of an infectious titre of 6,5 - 7,5 lg EID₅₀/O₂cm³ were used for indication of virus strains.

We used Webster-Pereira's [18] and Paniker's [16] methods for RIHA determination in our studies.

Enzyme activity was estimated after Aminoff's method [12]. Ovomycine prepared after Gottschalk-Lind's [13] method was applied as substrate. Enzyme activity was expressed in mkg/mg protein determined after Lowry's method. Extinction was read on spectrophotometer of "VSU-2p" model at wave length of 549 nm.

Results were statistically processed by the methods of correlation and dispersion analyses [4,8,10].

RESULTS AND DISCUSSION

The analysis of antigenic relationships of influenza virus neuraminidase type N2 reveals that enzymes of these strains interact by a different manner with recombinant antisera (table 1).

Table 1

Antigenic interrelations of neuraminidase in influenza virus type A strains isolated during the period from 1957 till 1984

Viruses Strains	Recombinants		TIN50 °C	TIN °C
	X-7 HON2-1	X-97 HON2-3		
A/Singapore 1/57 (H2N2)	1:1350 100%	1:64 4,4%	55,8 + / - 0,25	58-60
A/Sofia 1/57 (H2N2)	1:1270 100%	1:169 12,9%	55,45 + / - 0,13	58-60
A/Hong Kong 1/68 (H3N2)	1:223 16,5%	1:158 10,9%	52,1 + / - 0,10	56-58
A/Sofia 142/69(H3N2)	1:362 28,5%	1:239 17,7%	51,95 + / - 0,34	56-58
A/Victoria 35/72 (H3N2)	1:45 3,3%	1:1450 100%	49,35 + / - 0,10	52-54
A/Varna 123/76(H3N2)	1:223 17,6%	1:1350 100%	49,22 + / - 0,10	52-54
A/Texas 1/77 (H3N2)	1:30 2,2%	1:1100 75,8%	47,56 + / - 0,10	50-52
A/Varna 31/784(H3N2)	1:112 8,8%	1:891 66%	47,16 + / - 0,20	50-52

When A/Singapore /1/57 is concerned, percentage ratio of opposite values of reaction titres is the smallest at $x - 49 - 3,8$ per cent. The highest percentage is at $x - 7 - 100$ per cent. When the strain of A/Hong Kong /1/68 is concerned, percentage ratio of opposite values of reaction titres is the smallest at $x - 49 - 6,2$ per cent and at $x - 97 - 10,9$ per cent but the highest one at $x - 2967 - 100$ per cent. For the strain of A/Victoria /35/72 percentage ratio of opposite values of reaction titres is the smallest at $x - 7 - 3,3$ per cent but the highest one at $x - 97 - 100$ per cent. For the strain of A/Texas /1/77 percentage ratio of opposite values of reaction titres is the smallest at $x - 2967 - 1,8$ per cent and $x - 7 - 2,2$ per cent but the highest one at $x - 49 - 100$ per cent.

Concerning the local strains, this ratio is as follows: for A/Sofia /1/57 - highest at $x - 7 - 100$ per cent; for A/Sofia /142/69 - highest at $x - 2967 - 100$ per cent; for A/Varna /123/76 - at $x - 97 - 100$ per cent, and for A/Varna /31/7/84 - at $x - 49 - 100$ per cent.

These deviations argue for differences in the antigenic interrelations between these standard influenza virus strains and for an equality of these interrelations between standard and local strains as follows: A/Singapore /1/57 with A/Sofia /1/57; A/Hong Kong /1/68 with A/Sofia /142/69; A/Victoria /35/72 with A/Varna /123/76, and A/Texas /1/77 with A/Varna /31/7/84.

These different relations of neuraminidase of examined strains undoubtedly argue for the existence of neuraminidase heterogeneity. Our results coincide with these of other investigators [2,5,7,9].

CONCLUSIONS

1. Our investigations of neuraminidase N2 antigenic characteristics enable us to conclude that its structure is heterogenous and that they exist subtypes of N2.

2. Our results allow us to suggest, similarly to other authors, that second neuraminidase type can be divided into 4 subtypes: N2-1, N2-2, N2-3, and N2-4.

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**ОПРЕДЕЛЕНИЕ АНТИГЕННОГО ПРОФИЛЯ
НЕВРОМИНИДАЗНОГО КОМПОНЕНТА НЕКОТОРЫХ
ЭТАЛОННЫХ И МЕСТНЫХ ШТАММОВ ВИРУСОВ ГРИППА
ТИПА А ПО МЕТОДУ РЕАКЦИИ ЗАДЕРЖКИ
ГЕМОАГГЛЮТИНАЦИИ (РЗГА)**

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РЕЗЮМЕ

В своих исследованиях авторы использовали эталонные и местные штаммы вирусов гриппа типа А со вторым серотипом невраминидазы: А/Сингапур/1/57 (Н2Н2); А/Хонг Конг/1/68 (Н3Н2); А/Виктория/35/72 (Н3Н2); А/Тексас/1/77 (Н3Н2), а также штаммы, изолированные в стране: А/София/1/57 (Н2Н2); А/София/142/69 (Н3Н2); А/Варна/123/76 (Н3Н2) и А/Варна/31/7/84 (Н3Н2).

При изучении антигенных взаимоотношений N2 было установлено, что энзимы исследованных авторами вирусов гриппа входят неоднозначно во взаимодействие с антисыворотками рекомбинантов.

Установленные факты позволяют авторам сделать вывод о вероятной гетерогенности структуры невраминидазы и о существовании подтипов N2.