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Short Communication

Traditional and Prospective Approaches to Influence Prevention

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Abstract

Present day vaccines have a key role in influenza prophylaxis. Besides, there is a wide spectrum of pharmaceutics: antigrippine I, II, III, amantidin, remantadin, arbidol, laferon, etc. Anti-influenza vaccines and pharmaceutics mentioned above might cause side effects of blood circulating system (thrombocytopenia), immune system (allergic reactions), nervous system (frequent headaches, and less frequently cramps, encephalomyelitis, neuritis, Guillain-Barre syndrome), vascular system (vasculitis with acute damages of renal function).A new generation of antiviral remedies in the form of neuraminidase (zanamivir and oseltamivir) have appeared. They are free of the main drawbacks typical for vaccines and pharmaceutics of amantadin type and cause less resistance in viruses. Domestic scientists used the effect of influenza virus hemaglutine splitting by trypsin-like proteinase of respiratory tract cells of epithelium at two subunits (hemaagglutinin-1 and hemaagglutinin-2) have isolated inhibitor of trypsine-like proteinases which arrested development of influenza in white mice. Now they are searching biological material for isolation of trypsine-like proteinases as anti-virus remedy for a human.

Keywords: Influenza A Virus; Vaccines; Proteinase Ingibitors; Drags

Influenza and acute respiratory viral infections (ARIs) rank first in the frequency and number of cases in the world and account for 95% of all infectious diseases. Influenza is a global problem in the world. Dr. Daniel Lavanch of the World Health Organization formulated a symposium on the "50th anniversary of influenza surveillance", which is the year of the flu every year. Although pandemics occur only once every 10 to 40 years and claim a large number of lives, it is the annual epidemics that have the greatest impact on society. They occur with the predicted regularity every year and can be characterized by huge losses, prevailing in their cumulative effect over pandemics [1].

Over the last few years, there has been a steady increase in health care costs, regardless of how health care is organized, the creation of new technologies, the introduction of higher demands on patients, an increase in the frequency of pathological factors associated with unemployment [2].

One of the biggest economic losses is the flu and other respiratory diseases. The magnitude of the damage caused by influenza and influenza-like infections to the health of the population and the economy of any country can be compared only with cardiovascular disease and malignant tumors. The spread of influenza and other SARS significantly outweighs the sum of all other infectious human diseases [3].

The danger of influenza epidemics is sharply exacerbated by a concentrated massive blow to the health and economy of the country. In a short period of 3 to 4 weeks, the flu disables in any month, in the period from December to March up to 30 and even up to 50%all children and adults of the urban population. Material damages are not limited to the significant amounts spent by trade unions to pay for mass cases of temporary incapacity for work. Even more significant economic losses due to production disruptions in all sectors of the economy, caused not by the employment of some workers and employees due to illness or care for sick children.

About $ 14.6 billion is spent annually on the treatment of influenza and its complications worldwide. USA.

It is estimated that in Ukraine the loss from each case of influenza averages 272-544 hryvnias/50-100 dollars have 6-14 days. Given the exceptionally high incidence, every sixth inhabitant of Ukraine suffers from influenza annually, the damage from influenza for the country's economy is huge [3]. Labor losses on a case-by-case basis According to current estimates, influenza is the direct cause of death in only 25% of cases [4]. This is due to the fact that the cause of death at influenza complications or exacerbations of background pathology/diseases of the cardiovascular, respiratory, endocrine systems. These causes form latent mortality in high-risk groups infants, young people with chronic diseases/and underestimation of mortality due to influenza [5].

Losses from influenza in Russia, according to the "Pharmaceutical Bulletin", average about 10.3 billion rubles., Which corresponds to 74.9 - 86% of all infectious diseases. In Russia, annually register from 27.3 to 47.2 million.patients with influenza and other SARS. Despite the large body of evidence supporting the effectiveness of modern influenza vaccines and the increasing use of vaccines in recent years, most high-risk patients remain uncovered by annual vaccination, contrary to the recommendations of experts. Insufficient use of vaccination due to doubts about the safety of vaccines. Between 1980 and 1994, 625 million doses of influenza vaccine were administered in the United States, Spain, Italy, France, the United Kingdom, Belgium, and the Netherlands. In 1998 alone, 125 million doses of vaccine were administered in the United States and Europe.

Vaccines now play a leading role in influenza prevention. Vaccination is recommended in all risk groups, which can significantly reduce the incidence of influenza-related complications and mortality.However, it should be noted that the effectiveness of vaccination is a variable, and in the group of elderly people it may be below 50% [6].

Although live influenza vaccines (HCV) have been around for some time and have been used in one form or another for more than half a century, none of them are currently licensed, despite the public's positive attitude towards vaccines containing other live viruses and the successful immunization of the population. against diseases caused by these viruses. To some extent, this is due to the fact that they are inactivated vaccines (IP), on the one hand, remain available and, on the other hand, provide satisfactory protection, although they are characterized by a number of inherent shortcomings due to the high mutagenicity and evolutionary instability of the virus that is part of them.At the same time, in the last decade, GHVs have appeared, in which weakened genes have been introduced by genetic recombination. Recombinant viruses (first obtained by HF Maassab) have in their structure genes for internal or non-structural proteins of the virus from the standard "source vaccine strain", which transmit the characteristics of cold resistance (CS) and heat sensitivity (PM) to viruses containing glycoproteins hemaglutinins and (HA) wild viruses that have recently appeared in nature [7].

Immunity is transmitted mainly by proteins GA and HA. Currently available inactivated vaccines are safe and effective means of immunization, provided that their composition corresponds exactly to the strain of the virus circulating in nature. However, the immunity provided by them persists for a relatively short time and is often narrowly specific. Because GHVs can simulate natural infection, they may be more immunogenic and cause longer immunity, possibly due to their ability to stimulate local and cellular immunity more effectively. In addition, it should be noted that IP do not have optimal efficacy in the vaccination of the elderly and, at the same time, are characterized by relative reactogenicity in the youngest patients. The information we have to date is not exhaustive, but still suggests that age alone may not be a factor preventing immunization with GHV [8].

The advantage of live vaccines over inactivated ones, or their equivalence, has yet to be confirmed by a more careful comparison of GHV and IP. Although HCV is attenuated, it still contains cytonecrotizing viruses that damage the airway epithelium,

creating a favorable environment for re-bacterial colonization or infection, as in the case of natural infection [9].

Despite encouraging evidence of the genetic stability of GHV, the viruses that make it up inevitably undergo the same evolutionary stresses as wild-type viruses, leading to reversibility, extragenic suppression, and recombination with wild-type viruses. The likelihood of reversal increases if HCV is given to immunocompromised individuals who are likely to have a prolonged infection. In addition, more information is needed on the genetic nature of the virus that reproduces after vaccination [10].

Is there a need for annual tests of attenuation and immunogenicity of each new vaccine before its widespread use (as a result of adding new HA and HA genes to the bases of the attenuating genes of the original vaccine strain, these characteristics may change).In the event of an epidemic, will LGVs become a strategic resource due to a simple route of administration, or will they be dangerous due to the possibility of premature production and spread of wild virus genes by external proteins of the pandemic virus? influenza [11].

Will inactivation, in addition to, or an alternative to inactivated influenza vaccines replace FGV?? solve the problem of returning virulence. We will be able to form a more accurate idea ofthe real role of HCV, their benefits and the hidden dangers in them, most likely only after the large-scale use of these vaccines in practice [12,13].

For the prevention of influenza today there is a wide choice of drugs: anti-influenza I, II, III; amantadine, rimantadine, arbidol, laferon and others. Antigripin is a homeopathic remedy for the treatment and prevention of influenza and SARS. Contains herbal extracts and minerals prepared using classic homeopathic methods.

Amantadine, rimantadine - finally the mechanisms of antiviral activity are not clear. It is known that both drugs disrupt virus replication. The drugs directly interact with the viral protein M2. This protein forms ion channels in infected cells, providing the initial stages of virus replication. Ion channels also cause inflammation in the cells of the upper respiratory tract. As well as It is known that inflammation is the most important factor in the spread of viral infection. Therefore, blocking the functions of the ion channel leads to the fact that the virus loses the ability to multiply and infect cells of the upper respiratory tract [14-16].

Arbidol has interferon-inducing activity and stimulates humoral and cellular immune responses, thereby increasing the body's resistance to viral infections [17,18].

The above drugs and influenza vaccines can cause side effects from the circulatory and lymphatic systems (thrombocytopenia). From the immune system - allergic reactions, in very rare cases - anaphylactic shock. From the nervous system - often headache and, rarely, paraesthesia, convulsions, encephalomyelitis, neuritis, Hyena-Barre syndrome. From the vascular system - vasculitis with transient renal dysfunction. Common disorders include fatigue, neuralgia, fever, weakness, tremors, sweating, and muscle and joint pain [19,20].

When using vaccination and drugs in humans, anti-infective immunity is formed.When using vaccination and drugs in humans, anti-infective immunity is formed. The main function of the immune system is protection genetic integrity of the organism from the penetration of foreign substances. This protection is provided by a complex system of organs, cells and soluble factors. Two main phenomena take part in the mechanisms of the organism's resistance to genetically foreign information: nonspecific resistance and acquired immunity [21].

Acquired anti-infective immunity reflects the specific resistance that occurs in the body during its life against specific types of microorganisms.

The acquired anti-infective immunity is not separated from the nonspecific resistance of the organism, which is provided by the systems of phagocytes, complement, natural killers, lysozyme, interferons and other mediators of cell interaction caused by non-specific stimuli; proteins of the acute phase of inflammation and other substances involved in the mechanisms of inflammatio Humoral and cellular factors take part in development of antiviral immunity. Features of antiviral immunity are due to the peculiarity of the structure and biology of viruses. Immunity is aimed at neutralizing and removing from the body the virus, its antigens and virus-infected cells. Acquired antiviral immunity, like other types of anti-infective immunity, begins to develop from the stage of providing antigen to T-helpers. The intensity of antiviral immunity depends on the level of circulating antibodies and the formation of cytotoxic lymphocytes. Cytotoxic lymphocytes cause lysis of virus-

infected cells. Antibodies produced by viral infections act directly on the virus or on cells infected with the virus. In this regard, there are two main forms of antibody involvement in the development of antiviral immunity. One of them is the neutralization of the virus antibodies. Such neutralization prevents the reception of the virus on the cell and its penetration into the cell. The second form of antibody involvement is the lysis of infected cells. The bulk of antibodies are immunoglobulins of class G. Antibodies of class M indicate a recent infection, they appear earlier and disappear earlier than Ig G. The strength of immunity in various viral infections is significant significantly varies. In some infections (mumps, rubella, chicken pox, measles) immunity is quite stable. Recurrent diseases in this case are rare. Less stable with stable immunity develops in infections of the respiratory tract and intestinal tract. Influenza immunity persists for several months. Recurrent influenza is due primarily to the fact that there is a constant drift of surface antigenic viral proteins and the replacement of circulating strains [22].

With the advent of a new generation of antiviral drugs for the treatment of influenza in the form of neuraminidase inhibitors, there is a need to revise the current strategy to combat this disease. Clinical studies have shown that these new drugs (zanamivir and oseltamivir) do not suffer from the main disadvantages of amantadine and rimantadine. Neuraminidase inhibitors are effective against both type A and type B viruses, do not cause side effects, or have less pronounced side effects, are less able to cause resistance in viruses, compared to other existing antiviral drugs [23-26].

Domestic scientists, using the effect of cleavage of influenza virus hemagglutinin by trypsin-like proteinases of respiratory tract epithelial cells into two subunits (HA1, HA2), obtained a trypsin-like proteinase inhibitor, which blocked the development of influenza in live mice and white mice. Currently, there is a search for a biomaterial to obtain a trypsin-like proteinase inhibitor as an antiviral drug for humans [27,28].

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