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On a Nature-like Technology for Treatment of Human Viral Diseases Based on the use of Simulated Microwave Radiation from the Sun

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***Abstract*—The relevance of developing a new effective nature-like medical technology, which is intended for the prevention and treatment of diseases of viral and bacterial etiology, both now and in the future, is substantiated. This technology is aimed at the formation of antiviral protection in the body in the absence of appropriate vaccines for this. The mechanism of corrective action when using the simulated microwave radiation of the Sun on the human body is considered. It is based on the "radio vibration" effect due to the conversion of electromagnetic energy absorbed by the body into the energy of low-intensity elastic vibrations. This makes it possible to activate inhibited enzyme complexes for restoration in cellular structures under conditions of hypoxia of the free energy potential necessary for the synthesis of biostructures not only for antiviral, but also for antibacterial protection, regardless of the strain of the virus or the pathogenic microorganism. The evidence of the feasibility of using the developed hardware and software tools for modeling the microwave radiation of the Sun to provide antiviral protection is presented. The content of the article is addressed not only to virologists and immunologists, but also to government officials to coordinate efforts in developing areas of research to protect the population from a pandemic.**

Keywords—coronavirus, pandemic, radiation, the sun, technology, efficiency.

I. INTRODUCTION

The events of end of 2019 and the beginning of 2020, related to the appearance from the beginning in China, and then in many countries of the world of a new viral disease COVID-19, showed the unwillingness of the world healthcare system to adequately respond to it. The lack of the SARS-CoV-2 coronavirus vaccine and the effective means of controlling it has led to unprecedented in modern history the actions of governments of a number of states on the non-proliferation of this virus among the population. In particular, state borders are being closed; limited population movements across territories; time restrictions are imposed on holding various kinds of mass events; there is a transition to distance learning in schools, secondary and higher educational institutions, etc. The strengthening of the negative impact factor on the population of countries associated with the spread of the new coronavirus is also due to the fact that the World Health Organization openly stated that "the world is facing a pandemic."

All of the above requires an analysis of the causes of the situation, an assessment of the effectiveness and feasibility of measures taken to mitigate the negative "scenario" of the development of events associated with coronavirus.

The main content of the article, which determines its relevance, it's connected with the substantiation of the possibility of developing a new effective nature-like medical technology, which is aimed at fulfilling the antiviral role in the absence of appropriate vaccines in the fight against existing viral pathogens that are potentially dangerous for humans in the future.

II. THE MAIN REASONS FOR THE EMERGENCE OF A NEW CORONAVIRUS COVID-19

Coronaviruses are an extensive group of viruses' that infect animals and humans. According to various sources of information, about a hundred strains of coronaviruses are currently circulating in the wild. But only a few of them are pathogenic to humans. When they enter the body, its intoxication is expressed, causing problems in the respiratory and digestive systems. Most human coronaviruses, such as acute respiratory disease (ARVI), cause mild symptoms of a cold or gastroenteritis (food poisoning). However, since 2002, the clinical situation with coronavirus has changed dramatically. And this is due to the emergence of severe acute respiratory syndrome (SARS), which is accompanied by rapidly developing pneumonia, respiratory and renal failure. Then, in 2015, an outbreak of Middle Eastern respiratory syndrome (MERS) occurred. And finally, in 2019, the new SARS-CoV-2 coronavirus appeared. The clinic of the above-mentioned coronavirus infections is somewhat similar to the extremely difficult variant of ARVI. But there are previously unknown manifestations of them.

To date, the main source of the new coronavirus is most often called bats. For them and other carriers of coronaviruses in the wild, these viruses appear to be natural regulators of natural selection. The mechanism of the transition of

coronavirus from animal to human is not yet clear. At the same time, on the basis of existing experience with a greater degree of certainty, it can be argued that the increased activity of coronavirus, manifested in its pathogenicity to humans, is directly related to climate change, various types of environmental pollution that negatively affect humans and animals in the wild. Not the last place in this list of reasons for the decline in the protective functions of the body it's occupied by the tense social and economic conditions of life of large groups of the population.

Despite the measures taken to weaken the influence of the above factors on organisms, it should be recognized that they are objective and many generations of the human population will have to live with them. If this assumption is taken as a basis, then the SARS-CoV-2 coronavirus is not the last test for humans, based on the total number of coronaviruses indicated above. In these conditions, to prevent the negative impact of potentially dangerous causative agents of viral diseases on humans, it's not only a clear organization of anti-epidemiological measures is necessary, but also the development of universal technologies for their prevention and treatment. Such technologies should be effective, first of all, in the early stages of the disease, both when used autonomously and in combination with well-known medications, regardless of a particular strain of the virus. They should be based on evolutionary nature-like mechanisms of regulation, which in the recent past have provided the development of flora and fauna that is resistant to external and internal negative factors.

III. On the Traditional and Non-Traditional Approach to the Prevention and Treatment of Human Viral Diseases

Currently, the traditional approach to the prevention and treatment of infectious diseases is based on large-scale vaccination of the population [1]. For over 200 years, this method of preventing such diseases has been the main, simplest and most economical way to protect a person from infections. The mechanism of such protection against a possible disease consists in stimulating, with the help of a special vaccine, the production of antibodies by the body for early recognition of its pathogen.

In the absence of an appropriate vaccine, modern medicine is practically ineffective in helping the patient cope with his illness. A positive outcome in the fight against infection by the body depends on the effectiveness of the human immune system in a timely manner to form the necessary defense complexes. This complex includes the production of intracellular interferon and extracellular immunoglobulin M by the body corresponding to the causative agent of the disease, by the system of its humoral regulation to counteract the multiplication of the virus and its neutralization, respectively.

Unfortunately, for a weakened immune system, which is characteristic primarily for older people, often with chronic diseases, the outcome in confronting an unknown virus will often be fatal for them. Statistics in the fight against the new coronavirus confirm the above. What is the reason for the weakening of the immune system and what needs to be done to accelerate its response to a particular pathogen?

To answer the question posed, it is necessary to pay attention to the fact that the acceleration or deceleration of metabolic processes is directly related to the quality of the fulfillment of their functions by the enzymatic complexes of the body.

With the penetration of the virus into cells and its subsequent uncontrolled reproduction, processes occur that lead to intoxication of the body. It causes the occurrence of hypoxic phenomena in its organs and systems. A direct consequence of hypoxia in the body, accompanied by a shift in the pH of the medium (pH) to the acid side, is a decrease in the efficiency of production of adenosine triphosphate (ATP), the main source of cell energy. It is based on the replacement in cells of aerobic energy exchange by anaerobic. To assess the quantitative indicators of a possible decrease in the "production" of ATP, it is necessary to compare the results of oxidation reactions (1), (2) of one mole of glucose ($C_6H_{12}O_6$) during aerobic and anaerobic cell respiration, respectively [2]

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 38ATP, \quad (1)$$

$$C_6H_{12}O_6 \rightarrow 2CH_3CHOHCOOH + 2ATP. \quad (2)$$

From the above reactions it follows that the amount of ATP formed during aerobic respiration is 19 times greater than during anaerobic respiration. The main product of anaerobic energy exchange is lactic acid, $CH_3CHONSOOH$, which "as if binds most of ATP", makes it impossible to use it in metabolic processes to ensure homeostasis. This leads to a decrease in the free part F of internal energy in the body, used, in particular, for the synthesis of the necessary protein structures to protect the body from the virus that has penetrated into it.

One of the reasons for the decrease in the efficiency of ATP "production" under hypoxia is the process of inactivation of enzymes in the respiratory chain of mitochondria. In aerobic energy exchange, the reaction equation describing the interaction of a negatively charged enzyme (Enz^-) with a positively charged substrate (SH^+) has the form [2]

$$Enz^- + SH^+ \rightarrow Enz - SH \quad (3)$$

Its result is the formation of the $Enz - SH$ enzyme – substrate complex. When the pH is shifted to the acidic side, the process of protonation of enzymes takes place (their inactivation by the excessive content of protons in the cytosol (H^+))

$$Enz^- + H^+ \rightarrow Enz\ H \quad (4)$$

Thus, the development of the pathological process is characterized by a significant decrease in the cellular structures of ATF synthesized in them, due to the protonation of enzymes. The protonation of enzymes is not the only mechanism for their inactivation. Others are also known. Together, they underlie the slowdown in the synthesis of both

interferon and immunoglobulin, which is corresponding in structure to protect the body from a particular virus.

In this case, it is essential to determine the most effective way to restore their enzymatic activity. They are also famous. Of the most common methods, you can specify those that are aimed at restoring acid-base balance, increasing the concentration of the substrate, etc. But all of them have a large inertia (time delay) of their corrective action. This inertia does not allow to provide the required rate of restoration of the activity of enzymatic systems. It is necessary to use a method of direct impact on the process of deprotonation of enzymes or on the structures that cause their inhibition.

In this regard, it is necessary to pay attention to the evolutionarily significant controlling role in the living nature of the microwave radiation of the Sun reaching the Earth's surface [3]. The informational nature of this radiation, with a high degree of probability, was the basis of the formation in the body of the mechanism of neural and humoral regulation [4]. This mechanism is designed to provide in it a controlled rhythm of processes at various levels of its organization. They are the most important stabilizing and regulating factor of its internal environment under various negative external and internal influences.

To date, there is no full understanding of the mechanism of interaction of the cellular structures of the body with low-intensity electromagnetic radiation. Studies to evaluate the mechanism of this interaction indicate its "radio-vibrational" nature, due to the excitation of elastic vibrations under the influence of the Ampere force *dF* formed in cellular structures when exposed to electromagnetic radiation [5]

$$d\boldsymbol{F} = \boldsymbol{j} \times \boldsymbol{B} dV, \qquad (5)$$

where $\boldsymbol{j}$ - is the current density in cellular structures induced by the electrical component of electromagnetic radiation; $\boldsymbol{B}$ - the resulting magnetic induction due to the magnetic component of electromagnetic radiation and the Earth's magnetic field; dV is the volume element affected by the Ampere force $d\boldsymbol{F}$.

The frequency-dependent nature of the amplitude of the current density $\boldsymbol{j}$, which is characteristic when exposed to the body by low-intensity radiation of natural origin, forms a frequency-dependent change in the Ampere force. Under the influence of this force, spatially-spaced excitation of low-intensity low-frequency elastic vibrations of variable frequency in cellular structures will occur. Such vibrations, coming into resonance with intrinsic vibrations of the molecular structures of the cell, will "break" the weak bonds of enzymes with their non-functional inhibitors and, as a result, provide the necessary enzyme activity in order to increase the efficiency of ATF synthesis and other biostructures to form the necessary antiviral protection to counteract the development of negative processes in the human body.

Currently, the controlling role of the solar microwave radiation for organisms has noticeably weakened due to electromagnetic pollution of the environment [4]. To restore the controlling role of this radiation, it is necessary to use hardware-software tools for its modeling with an intensity commensurate with the intensity of radiation of technogenic origin [6].

IV. Hardware-software device for modeling the microwave radiation of the Sun and its application in clinical, biological and microbiological studies

The result of solving the existing problems of adequate modeling of the microwave radiation of the Sun was the development of a device that implements well-known knowledge about the structure of its low-frequency variations, the parameters of amplitude pulsations and the type of polarization of electromagnetic radiation in the frequency range 4.0–4.3 GHz with a maximum intensity not exceeding 100 μW / cm2 [7]. This device (Fig.1) allows you to simulate bursts of microwave radiation from the Sun in the range of values from several seconds to tens of minutes, with both linear and chaotic polarization. The amplitude spectrum of such radiation can vary both in width, in shape, and in intensity (Fig.2).

Fig. 1. The device for modeling the solar microwave radiation

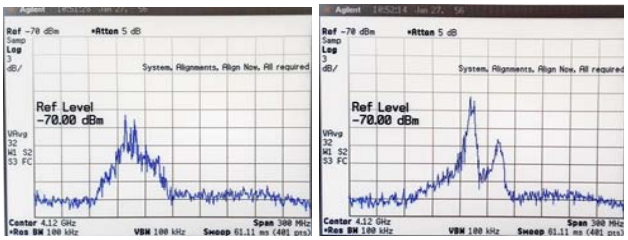

Fig. 2. Variations of the amplitude spectrum of the simulated microwave burst of the Sun at different points in time

Within the framework of specially developed programs at the clinical base of the Chelyabinsk State Medical Academy, under the leadership of MD, professor A.N. Uzunova, from 1992 to 2002, the effectiveness of the application of the developed hardware and software tools for modeling microwave radiation was evaluated The sun in the complex treatment of children living in a large industrial center of the Southern Urals (Chelyabinsk), with acute obstructive bronchitis, pneumonia, chronic pyelonephritis, sensorineural hearing loss, etc. [8,9,10,11,12]. Similar studies in the same period of time were conducted at the Ural State Medical Academy of Continuing Education in the treatment of a wide range of rheumatic and other diseases of adults [13].

The main results of the clinical trial cycle [14] are:

1) physiotherapy based on the use of hardware for modeling the cosmic microwave background in the frequency range 4.1 ... 4.3 GHz with a power flux density not exceeding 100 μW/cm2 is not associated with the phase of the course of the disease;

2) the effectiveness of the use of microwave therapy hardware is reliably manifested in a decrease in the activity of inflammation, a reduction of (30-40)% in the consumption of drugs and an accelerated (by a quarter) normalization of homeostatic functions.

In a biological experiment [15] to evaluate the modifying effect of simulated natural microwave radiation with the above parameters on the restoration of homeostatic functions in rats after acute blood loss, it was found that the used electromagnetic radiation causes them to improve thermoregulation processes, promotes accelerated restoration of the oxygen transport function of blood, aerobic energy exchange, protective functions in peritoneal cells of monocytic and neutrophilic series.

Other biological experiments [16] using the simulated microwave radiation of the Sun have confirmed its high efficiency, aimed at reducing hypoxic phenomena in tissue structures with various kinds of disturbances in the body of its homeostasis [19].

Summarizing the results obtained in the course of clinical and biological studies, we can conclude that they indirectly prove the possibility of the effective use of the simulated low-intensity microwave radiation of the Sun as an antiviral protection when an organism is infected with a virus.

Another problem associated with diseases of viral etiology is that their complicated form can cause bacterial inflammation in the organs and systems of the body, and the corresponding antibacterial drugs, due to the resistance of microorganisms to them, are not effective. In these cases, a fatal outcome is inevitable for a person.

To assess the modifying effect of the simulated microwave radiation of the Sun on conditionally pathogenic microorganisms: Staphylococcus aureus, Escherichia coli, etc., a cycle of microbiological studies was carried out from 2014 to 2016 under the supervision of a doctor of medical sciences on the basis of the South Ural State Medical University, Professor Shishkova Yu. S. Based on the results of the studies, it was concluded [17] that use of radiation with a natural time-frequency structure on the specified microflora leads in some cases to blocking the biofilm formation process, and a change in their biophysical and biochemical properties under the influence of this radiation helps to reduce the resistance of microorganisms to antimicrobial agents. Also, in the course of other studies, the high efficiency of the above radiation on the process of red blood cell disaggregation was reliably established [18]. The obtained result confirms the previously revealed pattern of improvement of the oxygen-transporting function of blood under the influence of simulated microwave radiation of natural origin.

CONCLUSION

Viruses in their diversity are part of nature. They are small in size protein structures, but "insidious" in their negative impact on the flora and fauna. The task of mankind is to find effective ways of "relatively peaceful" coexistence with them. One of them is associated with the use of vaccines. But this method does not "work" to outstrip the negative impact on the body of a new strain of the virus. In particular, the lack of a vaccine against the new coronavirus and effective traditional means of alleviating the course of the disease associated with it leaves a person alone with the natural factor of natural selection. This state of affairs for the prevention and treatment of viral diseases in the 21st century is unacceptable. It is necessary to develop alternative technologies that, in the absence of a vaccine, can effectively counteract the negative scenario of the consequences of a viral disease. One of these technologies is associated with a new section of heliobiology, which was named by the author: “microwave heliobiology” [4]. It uses a new nature-like approach to the prevention and treatment of human viral diseases, based on the use of microwave radiation of the Sun, modeled using hardware and software. The description of the main mechanism of its corrective action on the human body and the evidence of its validity in cases of inflammation in organisms at the clinical, to clinical, and partially at the microbiological level presented in the article provide grounds for predicting that use of these radiation will also be effective in human viral diseases. There is also reason to believe that under the influence of simulated nature-like radiation on an organism infected with a coronavirus, the antivirus protection generated by vaccination against other viral diseases can additionally earn. It only needs to be activated using electromagnetic radiation with a natural time-frequency structure. However, the final result of forecasts can only be made based on the results of relevant experimental studies. The organization of such studies is complex and requires the participation of government agencies responsible for carrying out a complex of anti-epidemiological measures, including the development of new technologies for the prevention and treatment of human viral diseases.

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