

Review Article

Open Access

COVID-19: The Importance of the Renaissance of Hirudotherapy to Overcome the Pandemic in Russia and in the World

Krashenyuk AI

Academy of Hirudotherapy, St.-Petersburg, Russia

SUMMARY

It's been 19 months since the pandemic began in Wuhan, China. The number of cases worldwide exceeded the mark of 238,100,805 people. 4,854,666 people died. This is WHO data with a delay of 24 hours on 10.10.2021. In the list of countries with the most affected coronavirus population, Russia ranks 5-th. Since then, the global medical community has become much better at understanding the pathogenesis of the new COVID-19 virus. Based on many years of research on the properties of leeches (hirudotherapy), treatment and rehabilitation of patients and those who have had the disease COVID-19 coronavirus are proposed.

*Corresponding author

Krashenyuk AI, Academy of Hirudotherapy, St.-Petersburg, Russia. E-mail: krashenyuk2013@yandex.ru

Received: October 14, 2021; **Accepted:** October 20, 2021; **Published:** October 28, 2021

Keywords: COVID-19, microthrombosis, Systemic Method of Leeching (SML) (hirudotherapy), neurotrophic effect, thrombolysis, immunomodulatory effect, detoxification effect, wave effect, effect of academician Kaznacheev V.P.

Introduction

The coronavirus pandemic has caused unprecedented strain on health services around the world, both in terms of vaccine development and treatment and rehabilitation of coronavirus patients. Observations of the tactics of treatment of this disease around the world are in the nature of panic moods. Of course, the medical community places great expectations on vaccination. And such vaccines have already appeared, the world's first vaccine created in Russia is "Sputnik-V".

Vaccines are also being created and tested in other countries, for example, the "Pfizer" vaccine (USA). According to immunologists, the creation of herd immunity can stop the pandemic when the number of immunized citizens in a particular country reaches at least 60%. But there are problems in this area as well.

What about asymptomatic forms of COVID-19? How to solve the problem of vaccination with antigenic variations of the virus, for example, with the appearance of a more virulent strain by 70% found in the UK? And will vaccination against the background of an asymptomatic course of the disease cause pronounced complications in the vaccinated?

There is no answer to these questions yet, and we have a problem that requires the strain of the collective intellect and labor of the existing civilization. Notably, the governments of India, China and other countries are actively promoting traditional treatments and prevention against COVID-19. The Government of India has issued a memorandum listing yoga, Ayurveda, Unani, Siddha,

homeopathy and naturopathy as potentially beneficial. Note that leech-drinking is one of the branches of Ayurveda.

The Chinese government attributes the country's relatively rapid turn toward integrating traditional Chinese medicine with traditional biomedicine in 90% of its COVID-19 patients. In reviewing the WHO strategy for traditional medicine (2014-2023) The Chinese government attributes the country's relatively rapid turn toward integrating traditional Chinese medicine with traditional biomedicine in 90% of its COVID-19 patients.

In reviewing the WHO strategy for traditional medicine (2014-2023), 88% of 194 Countries (179 countries) recognized the need to use traditional and complementary medicine methods [1].

However, only China has used the potential of traditional and integrative medicine in the fight against the COVID-19 pandemic [2, 3]. And it is most likely that this circumstance has allowed China to succeed in the fight against the pandemic. Today, we can talk about significant progress in understanding the pathogenesis of the coronavirus COVID-19. And in this regard, of considerable interest is the consolidated opinion of the Moscow Scientific Therapeutic Society, which, in the person of its leader, professor A.P. Vorobyev, expressed the hypothesis of Post-Covid syndrome [4].

The main provisions of this hypothesis are as follows: Post-Covid syndrome - chronic thrombovascular disease with a predominant lesion of the nervous system (brain, autonomous and peripheral systems) and skin.

The team of authors representing the Moscow Scientific Therapeutic Society proposed the following strategy for the treatment of Post-Covid syndrome:

1. Direct anticoagulants - apixaban 5 mg 2 times a day or rivaroxaban 10 mg 2 times a day for at least 2-3 weeks;
2. Plasmapheresis - at least 900 ml per procedure, at least 5 procedures, frequency every other day, saline replacement.

The use of these direct anticoagulants has a number of significant contraindications and complications in the defeat of the central nervous system, can cause bleeding, nasal, throat and kidney. As for plasmapheresis, the capabilities of Moscow clinics are not comparable with medical institutions in remote regions of Russia. Without giving up the importance of the proposed therapy, we offer an alternative way to address the challenge of reducing mortality from pneumonia and other complications caused by COVID-19.

Earlier, we have already expressed this point of view in the treatment of elderly people with multiple organ pathology, namely they become primarily victims of this pneumonia [5].

This is the application of the Systemic Method of Leeching (SML) - (hirudotherapy). The method is based on a combination of the principles of homeopathy and acupuncture (hirudopuncture, our definition). The proposed solution is based on almost 30 years of use of SMP in the elderly with multiple organ pathology and children treated at the Academy of Hirudotherapy of St.-Petersburg. The preventive and therapeutic plan of anticoagulant and antiplatelet therapy for the prevention of DIC- syndrome, distress syndrome is considered in stages from the standpoint of the SML in recent publications [6-8].

The thrombolytic function of leeching has a long history. Significant contribution to the understanding of the mechanisms of thrombolysis by medical leeches were introduced by domestic scientist's professors Baskova I.P. and Nikonov G.I.

Let's remind readers about some unknown properties of leeching. Over the past 30 years, the Academy of Hirudotherapy in St. -Petersburg has obtained a number of new fundamental facts when using the SML, which can significantly enhance the clinical effect of its use and will reduce the mortality of patients with pneumonia caused by the COVID-19 virus.

Based on the conclusion of the Moscow Scientific Therapeutic Society on the analysis of the main mechanisms of the pathogenesis of the COVID-19 virus, our work was published (priority of April 21, 2021), which details the therapeutic effects of medical leeches in relation to the treatment of Post- Covid syndrome [5].

In addition, an article was published even earlier on the topic: "COVID-19: Theoretical and practical justifications for reducing mortality and complications" [6].

This work also discussed the use of hirudotherapy in the disease Post-Covid syndrome, as well as in complications arising from vaccinated against coronavirus, regardless of the vaccine used.

As the author of these publications, I want to dwell on the most important features of the use of medical leeches in Post-Covid syndrome. In September 2021, an international conference was held in Russia dedicated to the 25th anniversary of the creation of the first in Russia and the world department of hirudotherapy [7].

The materials of this conference contain the most significant discoveries in the field of hirudology and hirudotherapy in Russia. Here are the most significant of them, since they served as the basis for the development of the Systemic Method of Leeching

(SML) (hirudotherapy):

1992 r. – The discovery of the phenomenon “Hirudobiopsy” (A.I.Krashenyuk, S.V. Krashenyuk);

1993 r. - The discovery of the energy effect (information-entropy)

(A.I.Krashenyuk, S.V. Krashenyuk) [9, 10];

1996 r. - The discovery of the neuritstimulating effect of the medical leech

(A.I. Krashenyuk, S.V. Krashenyuk, and N.I.Chalisova) [11-13];

2001 r. -The discovery of the acoustic effect of leeches (hirudotherapy).

(A.I. Krashenyuk, D.I.Frolov) [14];

2003 r. -The discovery of the detoxification effect of hirudotherapy.

(A.I. Krashenyuk) [15];

2004 r. - The discovery of the phenomenon of local hyperthermia in the body of the Benign brain tumor – neurinoma

(Kamynin Yu.F., Krashenyuk A.I.) [16,17];

2005 r. - The discovery of the non-entropy effect of leeches (hirudotherapy).

(A.I. Krashenyuk, G.N.Dulnev) [16];

2007 r. - The role of autohemohirudotherapy in the formation of immunomodulating effect of hirudotherapy is shown.

(A.I.Krashenyuk, S.V.Krashenyuk, Krylov A.A.) [8];

2010 r. - The discovery of the aquastructuring effect of leeches (hirudotherapy).

(Semikhina L.P., Krashenyuk A.I.) [18];

2016r. - The discovery of “Resonance – wave impact” of leeches on the state of the human aquasystem.

(Vlaskin S.V., Dubowitzky S.A., Krashenyuk A.I., Petrosyan V.I.) [19].

Based on the foregoing, we offer pathogenetic treatment of Post-Covid syndrome using SML.

1. Thrombolytic strategy. The thrombolytic function of leech has a long history. A significant contribution to the understanding of the mechanisms of thrombolysis by medical leeches made by the domestic scientists professors Baskova I.P. and Nikonov G.I. Due to the limited size of this publication, we suggest that we read in our recent publications a detailed analysis of the mechanisms of thrombolysis using a medical leech [6, 8, 20].

2. Exposure to the pathogenesis of the central and peripheral nervous system.

In 1996, for the first time in the world, the neurotrophic and neurostimulating effect of the medical leech (A.I.Krashenyuk, S.V. Krashenyuk, and N.I.Chalisova) was discovered and patented [11].

A scientific foundation has been established for unique clinical results for the treatment of muscle spasticity and the restoration of motor activity in children diagnosed with cerebral palsy (Cerebral Palsy) .

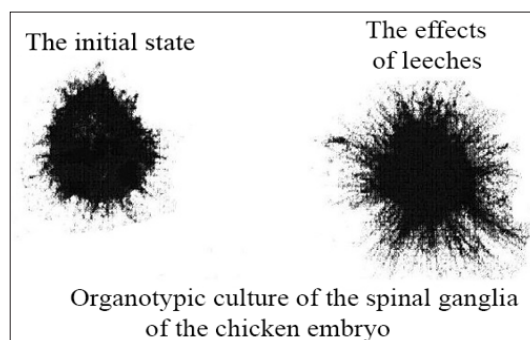


Figure 1: (Photo). Stimulation of nerve cells (neurons), observed by phase-contrast microscopy in the culture of nerve ganglion cells

10 - a day chicken embryo. After exposure to the water extract of the head of the leech, we observe a characteristic growth of neurites - (growths), acting as interneuron bridges [11].

To date, no clinic in the world for the treatment of cerebral palsy and muscle spasticity has not reached such a level of treatment. **Videophilm** - proof of our priority in this area "Cerebral palsy is treated only in Russia" can be seen on our website: **academia-hirudo.ru** This aspect is associated with the effect of the secret of salivary glands leech on nerve endings and neurons.

For the first time, this problem was raised by our research as a consequence of the treatment of children diagnosed with cerebral palsy (cerebral palsy), myopathy patients and children with alalia and autism [21-24].

Neurotrophic factors - low-molecular proteins, which are secreted by tissues - targets, are involved in the differentiation of nerve cells and are responsible for the growth of their processes. Neurotrophic factors play a big role not only in the processes of embryonic development of the nervous system, but also in the adult body. They are necessary to maintain the vitality of neurons.

The priority of discovering the neurotrophic factors of the medical leech belongs to us [11], Fig.1.

In the further development of this direction, professor Baskova's team I.P. has shown that the neurotrophic (neuritstimulating effect) is associated with the presence of **destabilase-M**, **bdelastazine** and **bdellin-B** in the secret of the salivary glands of the leech [25].

It should be noted that the discovery of neurotrophic factors of medical leech allows to define hirudotherapy as one of the leading technologies in the treatment of diseases of the nervous system: Parkinson's disease, multiple sclerosis, Alzheimer's disease, the effects of traumatic brain injury, stroke, minimal brain dysfunction (MBD), cerebral palsy, alalia, dysarthria, epilepsy, autism and other diseases of the nervous system. Table 1 shows that the neuritstimulating activity of destabilase-M is 10,000 times more active than that of the drug "Cortexin", popular in the treatment of neurological diseases.

In addition, "Cortexin" found the ability to cause allergic reactions, it is not recommended for pregnant women and when breastfeeding. The use of medical leeches has no such limitations.

Comparative assessment of the neuritstimulating effect of some biologically active compounds [25].

Table 1

Biologically active compounds	Effective concentration, ng/ml	Literary source
Proteinase C	10,0	Edgar D., 1978
Derivative of the brain neurotrophic factor	0,04	Barde Y.et al.,1980
Nerve growth factor	20,0	Levi-Montalcini R.,1982
Ciliar neurotrophic factor	10,0	ManthorpeM., et al.,1982
Monosialgangliosides	200,0	Facci L.,et al.,1984
Brain neuritstimulating protein	4,0	Goncharova V.P. with co-author,1985
Fibroblast growth factor	100,0	Gospodarowicz D. et al.,1989
Cortexin	100,0	Havinson V.H. with co-author,1997
Epithalamine	200,0	Havinson V.H. with co-author,1997
Destabilase-M	0,01 и 0,05	Chalisova N.I. with co-author,1999

Professor Vorobyev P.A., analyzing brain damage in COVID-19, draws attention to the fact that in addition to classical hemorrhagic strokes in the pathanatomy of deceased people, there is an unusual mechanism of damage to brain tissue - diapedesis (penetration) of red blood cells through the wall of brain capillaries [4].

This fact indicates a pronounced effect of the virus on the connective tissue of the vascular endothelium. But even in this case, leechtherapy is shown as a method of regeneration of connective tissue of blood vessels [26,27].

3. Treatment of depression. The ability to exhibit a neuroendocrine effect.

The ability of medical leeches to affect the level of neurohumoral mediators (neurohormones) in the central nervous system, which is the basis of numerous neuroendocrine effects of hirudotherapy, proved to be significant.

A significant factor in reducing the level of depression is the ability to increase the level of serotonin in the leeching session and after it. **Serotonin** (5- hydroxytryptamine, 5-NT) plays an important role in regulating emotional behavior, motor activity, eating

behavior, sleep, thermoregulation, is involved in the control of neuroendocrine systems. Serotonin can not only perform the role of a neurotransmitter, but also a neuromodulator (neurohormon) [28].

As follows from the description of the symptoms of pPst-Covid syndrome, we observe a pronounced lesion of the serotonin system of the brain, which, in our opinion, leads to the development of depression in the dowry syndrome [4].

In our work we investigated in detail the effect of leeching on the secretion of various neurotransmitters, including serotonin in the human brain [13,16]. At the same time, a violation of sensory functions - smell, vision, hearing, talk about a deeper lesion and other sensory systems. We are talking about the dopamine system (damage to the olfactory bulb), histamine - a violation of the regulation of blood pressure, thermoregulation - a decrease in body temperature). Given that leech-flow affects the level of almost most neurotransmitters, it follows an unequivocal conclusion that this method is pathogenetic in terms of the mechanism of lesions of the COVID-19 virus of the central regulatory systems of the human brain.

4. The detoxifying effect of leeches

For the first time, the phenomenon of detoxification described by us in the process of hirudotherapy [15] allows to excrete toxic products (endo - or exogenous origin), not passed metabolic transformations, which allow to remove them from the body with the help of the secretion organs. They are able to cause "stick leeches" (definition of zemstvo doctors for leeches, past the stage of blood-sucking) vomiting or death. This property of side leeches allows us to consider their behavior after bloodsuckering as a way of assessing **the integral toxicity of the patient's blood** (author's definition). We have established that the dynamics of the death of leeches allows to assess whether **the toxic product is circulating in the human bloodstream or comes from the matrix - intercellular space**. This fact allows us to recognize that hirudotherapy, unlike plasmapheresis, is capable of deeper cleansing of toxins, although it requires longer use.

Figure 2 shows the dynamics of the death of leeches in the treatment of a patient within 18 months with a diagnosis: "Chronic Poisoning Syndrome with drugs". In the right corner of the picture is shown deformation of the bodies of leeches, dying in the process of blood-sucking. Cause of death of leeches - expressed toxicity of the patient's blood due to the long-term use of drugs (anticonvulsant, hypotensive, nootropics, and vasodilators).

At the age of 7 years they were appointed due to epileptic disease and the patient took them for 11 years. When COVID-19 is affected, the human body experiences a state of intoxication, as intravascular thrombosis affects with the capillary network of many organs. As a result of this process, hypoxia occurs in various organs, which inevitably leads to the accumulation of toxins - products of toxic metabolism. Today, this is proven in the pathanatomy of people who died from COVID-19 in many countries, not only in China [29, 30].

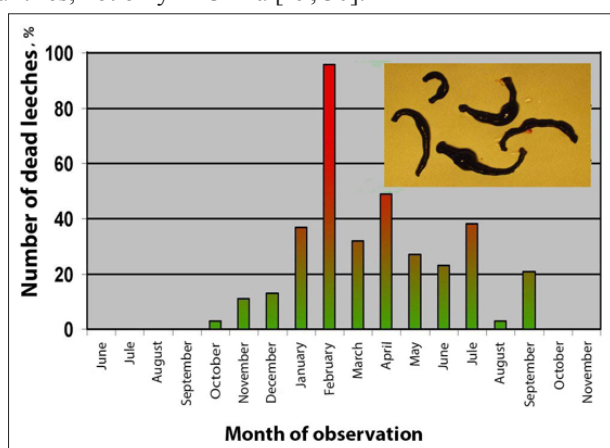


Figure 2: Dynamics of death of leech treatment in a patient with chronic drug poisoning. Diagnosis: a small form of epilepsy. The period of treatment is 11 years [5, 16].

That is why, leech is shown in the disease of moderate to high severity, especially since in many hospitals plasmapheresis is simply not available. We use leech with any form of COVID-19.

The discovery of the detoxification effect of hirudotherapy is also an opportunity to reduce the toxicity of vaccines, to prevent post-vaccination complications. And this is especially true against the background of the COVID-19 pandemic.

5. Suppression of coronavirus reproduction by cell protease inhibitors.

Another powerful argument for the use of SMP in the treatment of COVID-19 is the publication of scientists from the United States and Germany on the suppression of coronavirus reproduction by cellular protease inhibitors. In order to penetrate SARS-CoV-2 into the cells, its surface glycoprotein S must be cut by cellular proteases.

One such protease is the transmembrane enzyme TMPRSS2. However, as shown by studies of German scientists, conducted on the culture of human air pathway epithelial cells, in addition to TMPRSS2 virus needs another cellular protease - furin. Furin and TMPRSS2 break into different areas of the S-protein, and both ruptures are critical to the virus's ability to penetrate the cell. The knockdown of TMPRSS2 with the help of anti-sense RNA prevented the reproduction of SARS-CoV-2 cell culture. In addition, the virus was suppressed under the influence of two inhibitors TMPRSS2 (MI-432 and MI-1900) and aprotinin - a broad-spectrum serin protease inhibitor.

Replication of the virus also suppressed a furin inhibitor known as MI-1851. Moreover, the simultaneous action of TMPRSS2 inhibitors in conjunction with MI-1851 produced a more pronounced antiviral effect than the action of the equivalent number of each of the TMPRSS2 inhibitors studied without MI-1851.

Scientists believe that TMPRSS2 and furin are promising targets for COVID-19 therapy, and the use of their inhibitors, individually or in combination, should be considered as a way to treat the disease. Source: Dorothea Bestle, et al. / TMPRSS2 and furin are both essential for proteolytic activation and spread of SARS-CoV-2 in human airway epithelial cells and provide promising drug targets. bioRxiv, April 15, 2020; DOI: 10.1101/2020.04.15.042085

In connection with the mentioned publication of the mechanism of activation of coronavirus COVID-19, it is necessary to remind readers about protease inhibitors of medical leech.

Bdellins are the group of polypeptides with a small molecular weight, among which secrete bdellins A with a molecular weight of 7 kDa (in this group the most studied bdellastazine with a molecular weight of 6.3 kDa) and bdellin B with a molecular weight of 5 kDa. The method of equilibrium chromatography isolated numerous forms of bdellins A and B; they are marked from A1 to A6 and B1 to B6. Both are strong inhibitors of trypsin, plasmin and sperm acrosin. They do not block the activity of chymotrypsin, tissue and plasma kallikreins, subtilisin. They were first discovered by H. Fritz and co-authors in 1969. A recombinant form of bdellastazine has been obtained.

Girustasin – belongs to the same family of anti-stasine inhibitors of serin proteases. Selected in 1994 from extracts of medical leech. The molecular mass of girustazin is 5.9 kDa. It inhibits tissue kallikrein (but not plasma), trypsin, chymotrypsin and cathepsin G neutrophils. The ability of girustazin to block tissue kallikrein is a very important property, as the latter catalyzes the release of highly active kinins. Kinins through specific receptors on target cells modulate a wide range of biological activities, including those involved in maintaining normal blood pressure. Girustasin is also obtained in a recombinant form.

LDTI (Leech Derived Trypsin Inhibitor) - is a trypsin inhibitor derived from medical leech extract. Trypsin is the main component

of secretory cytoplasmic granules of mast cells and leads to the destruction of extracellular matrix proteins. The important role of tryptase in allergic and inflammatory reactions is known. As with many of the compounds already described, a recombinant LDTI has been created.

LCI (Leech Carboxypeptidase Inhibitor) - Carboxypeptidase inhibitor A. Isolated in 1998 and has two isoforms with molecular weights of 7.3 and 7.2 kDa. Stable over a wide range of pH and temperatures. Since this inhibitor is part of the secretion of the salivary glands of the medical leech, it can be assumed that it can block the hydrolysis of kinins by metalloproteinases at the site of biting the leech of the skin, thereby enhancing the increase in blood flow induced by kinins. A recombinant LCI has been created.

Eglins are low molecular weight proteins from medical leech extracts with molecular weights of 8.073 and 8.099 kDa ("b" and "c" shapes, respectively). They were first described in 1977 by U. Seemuller and co-authors. Inhibit activity alpha-chymotrypsin, mast cell chymase, subtilisin and proteinase neutrophils, elastase and cathepsin G.

They have high resistance to denaturation and warming. The inhibitory spectrum of eglin "C" allows us to consider it one of the most important anti-inflammatory agents. However, there are very serious reasons to believe that eglins, which are isolated from extracts of a medical leech, are not present in the secret of its salivary glands, but are secreted by the stomach gland.

The use of outpatient thrombolytic drug **Thrombovazim** for the prevention and treatment of distress syndrome, DIC- syndrome [31].

The properties of this drug studied to date indicate its prospects. But the hopes placed on it in combination with heparin are effectively solved when using leeching. The use of antiplatelet therapy (dipyridamol, aspirin) to prevent violations of microcirculatory blood flow in all patients is not required when using the systemic method of leeching. Mandatory use of therapy with thrombolytic drug Thrombovazim or anticoagulants in all patients with pneumonia when using the systemic method of leeching is not required.

The use of thrombolytic drugs of recombinant tissue plasminogen activators in patients with multiple organ failure when using the systemic method of leeching is not required.

It has been established that leech prostanoids inhibit platelet aggregation and stimulate the secretion of tissue plasminogen activator from the vascular wall. A marker of a high risk of an adverse outcome should be considered a level of D-dimer of more than 1000 ng / ml. According to our long-term observations, the use of SML can reduce the level of D-dimer to clinical norm.

"For six months after COVID-19, there is still a high risk of death from complications caused by инфекцией». About it on air of TV channel "Russia"24» said the Minister of health of Russia Mikhail Murashko 31August 2021.

The Minister of Health noted the need to undergo an in-depth medical examination for those who have had coronavirus infection in recent months. According to Minister M. Murashko, at this time the appearance of various complications associated with the formation of blood clots, damage to the nervous and cardiovascular system is possible, i.e. confirmed the conclusions of professor A.P.

Vorobyov and the hypothesis of the development of post-covid syndrome [4]. Expanded medical examination in order to identify complications after coronavirus infection and further treatment began in the regions of Russia from July 1, 2021.

The minister also warned of a greater lethality of the delta- strain of the coronavirus. "The mortality rate for COVID-19 caused by the delta- strain may be higher than in the previous period of rising incidence," he admitted. The list of new studies to reduce mortality after Post-Covid syndrome, as part of an extended medical examination, includes: spirometry (assessment of the functional state of the respiratory system); biochemical analysis of blood - seven indicators: study of cholesterol, low-density lipoproteins, C-reactive protein, determination of alanine aminotransferase activity, aspartate aminotransferase and lactate dehydrogenase, study of creatinine levels; determination of the concentration of D-dimer (biochemical marker of blood clotting) - for those who have undergone a new coronavirus infection in moderate and severe form; test with a six-minute walk (to identify possible problems in the heart and lungs, is carried out in the presence of complaints about shortness of breath and edema. Hemorrhagic complications with prolonged use of SML were not detected (the observation period in some patients was more than 22 years of constant use).

6. The immunomodulatory effects of medical leeches have not been sufficiently studied. Analysis of the literature shows that this is a multifactorial process, while discussing the activation of the macrophage link of immunity, the complement system and other levels of immune system response when using leeching.

For the first time, we drew attention to the currently unexplored property of leeching - **autohemohirudetherapia**, and proposed this term to refer to a new therapeutic factor of leeching. We are talking about subcutaneous microhumanrhages resulting from the process of bloodsucking [32,33].

With regard to the discussed topic COVID-19, attention should be paid to the work [34]. The immunomodulatory effect of leeching aimed at a specific restructuring of regulatory subpopulations of lymphocytes was detected. Thus, in some patients whose blood had an increased initial amount of CD4 (T-helpers) and CD25 (T-regulators) of lymphocyte subpopulations, these indicators decreased to physiological values. Simultaneously with the inhibition of CD4 and CD25 subpopulations took place increase in quantity and functional indicators among CD8 (T-killers/suppressors) and CD16 (natural killers).

To objectify the assessment of the helper-suppressor relationships of subpopulations in immunogenesis, the authors proposed a CD2 regulatory index (CD2 RI) with respect to the amount of CD4 to the sum of CD8 and CD16, on the basis that the latter subpopulations have common molecular cellular mechanisms of inhibition of immunogenesis. Before leeching, CD2 RI was 1.24 ± 0.07 , which indicates the tension of the immune system and an increase in the activity of CD4 (helper activation of immunogenesis). After leeching, this figure changed to 0.86 ± 0.07 due to the compression of excessive activation of immunogenesis.

These data allow us to count on the fact that the "Cytokine storm", which many publications talk about when analyzing the pathogenesis of COVID-19, will not arise, but will go to the "Cytokine calm" [35]. A very important aspect of the problem under discussion is the fate of those who have recovered from COVID-19. Leech treatment can prevent and treat the development

of pulmonary fibrosis. The instrument of treatment is the presence in the leech secretion of collagenase and elastase enzymes, which affect the connective tissue scars, causing their resorption [26].

7. Discovery of the wave effects of the leech. We have detected the phenomenon of wave emission by leeches in the process of blood-sucking in the kilohertz range and the ability to change the radiation of the body's aquasystem in the microwave/CVC range. This discovery allows us to consider another possible aspect of the therapeutic and preventive effect of SML [5,36, 37].

To date, it has been established that a significant proportion of medical personnel in different countries contract COVID-19 coronavirus. At the same time, the most likely version of the violation of the anti-epidemic regime by medical personnel. However, there is another reason - it is a remote (distant) interaction of the aquasystems of a sick and healthy person. Namely, we are talking about the opening of the academician V.P.Kaznacheev, L.P.Mikhailova, S.P. Shurin "The phenomenon of intercellular distant electromagnetic interactions in the system of two tissue cultures" (Number and priority date: No.122, February 15, 1966). **The authors discovered a new way of transmitting biological information.**

The essence of the discovery: in two vessels grew the culture of normal living cells. One culture was infected with the flu virus. Almost simultaneously, the cells in another vessel, which are only in optical contact with infected cells (the vessels came into contact with bottoms of quartz glass), reproduced a similar pathological process. When quartz glass was replaced by the usual, the situation changed: cells infected with the virus, died, and their neighbors normally shared and developed perfectly. The authors of the discovery believe that between the two fabrics cultures in the optical range have electromagnetic interactions. They showed the conditions under which the mirror cytopathic effect develops developed ways to increase the sensitivity of healthy cells to the perception of electromagnetic radiation of the affected cells. Using quantummetric equipment, it was found that the process of cell defeat, in particular, viruses, accompanies the characteristic kinetics of own electromagnetic radiation in the range of frequencies visible and ultraviolet area of the spectrum.

The discovery revealed a new information channel in biological systems, helped to develop a new approach to assessing the role of quantum phenomena in the functioning mechanisms of the cell's genetic program and information coding processes in specialized cellular systems, such as neurons. The correctness of the authors' experiments has been confirmed by many laboratories, including abroad. Confirmation was made at our department, on the model of ultraviolet radiation of people with the definition **criteria of chaos (K_{ch})** and **criteria of order (K_o)** on the device of the academician G.N.Dulnev "Eniotron"[38].

The significance of this work lies in the fact that distant interactions are demonstrated not on a model of fibroblasts infected with the influenza virus, but directly on humans, and it is proved that the wave distant interaction of people's aquasystems does take place.

From this point of view, the protection of health workers requires a special design of protective clothing of doctors, i.e. protection from electromagnetic radiation of the aquasystem of the corona patient COVID-19 person. Wave leeches significantly exceed the radiation of influenza and herpes serotype 2 viruses (from the

literature data 800 and 440 Hz respectively).

The radiation frequency of COVID-19 coronavirus radiation from Internet sources is from 5.5 to 14 GC, which is lower significantly than that of a medical leech. And this is based on our assumption about the preventive role of SMP in health workers who come into contact with infected with the COVID-19 virus. In favor of our assumption is the fact that according to statistics among health workers most often fall ill nurses and surgeons, i.e. people who are most in close contact with patients COVID-19.

The possibility of transmitting weak radio signals from one aquatic environment to another is already a reality of our day. Today, the receipt of information copies of medicines - infocevtics [39]. The technology uses the ability of chemicals and biological substances to produce ultraweak radiation that can be transmitted over long distances across lines of communication, including the Internet.

Such radiation is perceived by water, which is able to reproduce the same pharmacological effects as the chemical sample. In fact, this is the story of a new pharmaceutical reality, when infocevtics, in the absence of any chemicals, exhibit a certain biological activity. In support of this direction we see such prominent names as immunologist Jacques Bonvenista, virologist Nobel laureate Luc Montagnier and other scientists. To support this direction, an international group of enthusiasts - physicists, engineers, biologists and practitioners - has created a DST fund. As a result, an original technology called IC-medicals was created. Such radiation is perceived by water, which is able to reproduce the same pharmacological effects as the chemical sample. In fact, this is the story of a new pharmaceutical reality, when infocevtics in the absence of any chemicals, there is a certain biological activity.

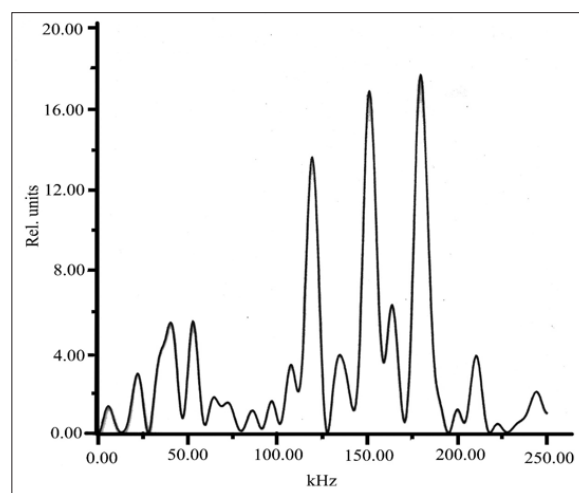


Figure 3: Recording the acoustic leech signal during the blood-sucking process after Fourier-conversion. Details of the experiment are laid out in the work [36].

Such radiation is perceived by water, which is able to reproduce the same pharmacological effects as the chemical sample. In fact, this is the story of a new pharmaceutical reality, when **infocevtics**, in the absence of any chemicals, exhibit a certain biological activity. In support of this direction we see such prominent names as immunologist Jacques Bonvenista, virologist Nobel laureate Luc Montagnier and other scientists.

To support this direction, an international group of enthusiasts - physicists, engineers, biologists and practitioners - has created a

DST fund. As a result, an original technology called IC-medicals was created. Since 2011, the effectiveness of the use of information copies of 60 drugs by the DST Foundation has been tested on patients with various diseases. More than 5,000 observations were made, the vast majority of which recorded positive results with almost no negative effects [37]. Let's not forget about the priority of the academician **V.P.Kaznacheev as the final conclusion of this chapter.**

Conclusion

In conclusion of the proposed publication, I would like to express the hope that the materials presented in the publication will save many more human lives, since training in the SMP technique is now available to doctors of any narrow specialization at the Academy of Hirudotherapy.

Today in Russia and 30 countries of the world there are doctors who have received training and knowledge of the technology of the System method of leeching at the Academy of Hirudotherapy, in St. - Petersburg.

For the whole world, 1500 doctors familiar with the technology of the, Systemic Method of Leeching (SML) are clearly not enough. But it is these specialists who today really save people with Post-Covid syndrome of varying severity, as well as with complicated cases of vaccination. Extended training of doctors from different countries on the technology of the Systemic Method of Leeching can be implemented only with the participation and under the patronage of the World Health Organization.

India is currently the second most affected country in the world after the US and faces a complex situation of inadequate medical infrastructure, insufficient investment and social structures [29]. With the increasing number of COVID-19 patients in India, there are increasing reports that patients are seeking help from Ayurveda doctors. Possessing such a capital as Ayurveda, and its component part- leeching (hirudotherapy), doctors in India and other countries could well use modern achievements in the field of leeching as one of the pathogenetic methods of treating their population, using the technology of the NSR. There's another issue that doesn't appear in the foreground yet, which is the problem of excess deaths of people who have had COVID-19. This is the problem of exacerbation of chronic diseases in the older group of the population. Practical experience suggests that rolling into the "Immune pit" (Decreased immunity in patients) **is the cause of excess mortality.** Another problem is the neurotropic of the COVID-19 virus. And since this property has in common with the herpes virus, we will soon have to make sure that COVID-19, like the herpes virus, will be able to integrate into the human genome, creating conditions for the lifelong persistence of this virus.

References

1. WHO (2019) WHO Global Report on Traditional and Complementary Medicine. Geneva: World Health Organization, 2019.
2. Chen K., Chen H (2020) Traditional Chinese medicine for combating COVID-19. *Front.Med* 2020: 1-4.
3. Liqiang Ni, Lili Chen, Xia Huang, Chouping Han, Jianrong Xu, et al.(2020) Combating COVID-19 with integrated traditional Chinese and Western medicine in China. *Acta Pharm. Sin. B* 10: 1149-1162.
4. Lecture by Professor P.A. Vorobyev. POST-COVIDE SYNDROME. <https://youtu.be/FB4EGWgb4VQ>
5. Krashenyuk A.I (2021) Covid-19: Prospects for the Treatment and Rehabilitation of Post-covid Syndrome by Ayurvedic Method – Hirudotherapy. *Acta Scientific Medical Sciences* 5: 133-134.
6. Krashenyuk A.I (2020) Coronavirus COVID-19 – Theoretical and Practical Substantiations for Reducing Mortality from Complications *Acta Scientific Medical Sciences* 4: 115-123.
7. Renaissance of hirudotherapy in Russia (2021) XX-XXI Century/Ed. Professor, Academician of the European Academy of Natural Sciences A.I. Krashenyuk. Team of authors. 2021, September 16-21, St. Petersburg: Asterion.- 344s.
8. Krashenyuk A.I, Krashenyuk S.V, Krylov A.A (2007) The role of the systemic method of hirudotherapy in the treatment of elderly people. *Non-drug medicine. A scientific and practical journal* 1: 59-73.
9. Krashenyuk A.I., Krashenyuk S.V (1993) Diagnostic value of Akabane test in hirudotherapy. The successes of hirudology. Materials of the III Conference of the Association of Girodologists. Under Ed. Ph.D. V.V. Ptushkin. M., 1993: 42-43.
10. Krashenyuk A.I., Krashenyuk S.V (1994) Hirudo - and yoga therapy as methods of bioenergy correction of the body' condition. *Advances in hirudology and hirudotherapy. Materials IV of the Scientific and Practical Conference of the Association of Hirudologists of Russia.* Edited Ph.D. Krashenyuk A.I. St.- Petersburg, 1994, 14-16.
11. Krashenyuk A.I., Krashenyuk S.V., Chalisova N.I (2000) The way of modeling the effect of medical leech on stimulation of nerve fiber growth in tissue culture. Patent RF No. 2144698. January 20, 2000.
12. Krashenyuk A.I., Krashenyuk S.V., Chalisova N.I (1997) Neurotrophic Factor *Hirudo medicinalis* (leech medical). "Hirudology-97." Materials of the Fifth Scientific and Practical Conference of the Association of Hirudologists of Russia. Red. Dr. B.D. Baskova I.P., D.M., Prof. Krashenyuk A.I. St. - Petersburg, 1997: 90-94.
13. Krashenyuk A.I (2020) Nerotrophic (Neural Stimulating) and Neuromediator Effects of *Hirudo medicinalis*. *Patogenetic Mechanism of Treatment of Diseases of the Nervous System of the Human. Acta Scientific Medical Sciences* 4: 01-06.
14. Krashenyuk A.I., Frolov D.I (2001) Interpretation of the nature of the energy-information effect of hirudotherapy based on the acoustic phenomenon. In: "Science.Information. Consciousness". St.- Petersburg, 2001: 89-90.
15. Krashenyuk A.I (2003) Medical leech as an indicator of integral blood toxicity (detoxification effect of hirudotherapy). "GIRUDO-2003." Edition 2nd, supplemented.M 2003: 69-71.
16. Dulnev G.N., Krashenyuk A.I (2010) From Synergies to Information Medicine. St. - Petersburg, Institute of Biosensor Psychology. 2010,167p.
17. Krashenyuk A.I (2020) Clinical Case of Conservative Leech Treatment of Neurinoma of the Brain. *Acta Scientific Medical Sciences* 4: 108-110.
18. Semikhina L.P., Krashenyuk A.I (2010) Aquastructuring effect of hirudotherapy. Theses of the 14th International Congress on Bioelectrography "Science. Information. Consciousness." St. - Petersburg, July 3-4, 2010: 33-34.
19. Vlaskin S.V., Dubowitzky S.A., Krashenyuk A.I., Petrosyan V.I (2016) "Resonance wave therapy and diagnosis." The results of the study and the prospects for use in leech. Second World Congress of Hirudotherapy. Abstracts. Moscow 2016: 35-39.
20. Krashenyuk A.I (2020) Justification of the use of hirudotherapy

- to reduce the severity of complications from COVID-19. Reflexology and complementary medicine 2: 25-33.
21. Krashenyuk A.I., Krashenyuk S.V (1997) Hirudotherapy as a method of rehabilitation of children suffering from cerebral palsy. International Journal of Immunorehabilitation 4: 118.
 22. Krashenyuk A.I. Krashenyuk S.V (1998) Children's Cerebral Palsy. In: Nikonov G.I., "Medical leech. The basics of hirudotherapy." SDS, St.-Petersburg, 1998,154-155.
 23. Krashenyuk A.I., Krashenyuk S.V (1994) Hirudotherapy in the treatment of myopathy. Advances in hirudology and hirudotherapy.
 24. Materials IV of the Scientific and Practical Conference of the Association of Hirudologists of Russia. Edited Ph.D. Krashenyuk A.A.I. St. – Petersburg 1994: 18-20.
 25. Krashenyuk A.I, Kondratyeva S.Yu, Krashenyuk S.V, Legkova A.V (2001) Application of hirudotherapy in defectology. Practical and Experimental Hirudology: Results for the Decade (1991 -2001). Materials VII scientific - practical conference of the Association of Hirudologists of Russia and CIS countries (October 30 - November 2, 2001), Lubertsy, Moscow Region, 2001: 27 - 28.
 26. Baskova I.P., Isahanyan G.S (2004) Hirudotherapy. Theory and practice. M., 2004, 507s.
 27. Nikonov G.I., Lebedeva A.O., Titova E.A., Romanenko E.B., Klochkov O.I, et al. (2014) Sedykh Yu.P., Betin E.M., Artamonov A.A., Betina N.V. Gel "HIRUDO" in the complex treatment of vascular pathologies. Asclepeion 2014: 29-34.
 28. Efimova A.O (2019) Pharmacological properties of Hirudo Medicinalis extract, ointment and gel based on it in a long-term application. (Experimental Research. Dissertation Ph.D., Old Kupavna, 2019: 123.
 29. Brain Biochemistry: Training manual. Edited by I.P.Ashmarin, P.V.Stukalova, N.D. Yetenko. Ed. S. - University of St. Petersburg, 1999: 328.
 30. Wu C, Chen X, Cai Y, et al.(2020) Distress Syndrome and Death in Patients With Coronavirus Disease 2019 Pneumonia in Wuhan, China". JAMA Internal Med. 2020 Mar 13. doi: 10.1001/jamainternmed.2020.0994.
 31. Zhou F, Yu T, Du R, et al. (2020)"Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 395: 1054-1062.
 32. Gromov A.A., Kruchinina M.V., Rabko A.V (2020) Coronavirus COVID-19- untapped therapy possibilities. Urgent press release.2078-266H.
 33. S.Hale Shakman. Autohemotherapy.Reference Manuel. (Russian ed.). www.Institute of Science.com 2010, p.254.
 34. Dagmar Lanninger-Bolling (2001) The healing power of blood. Guide to autohemotherapy. "Arnebia." 2001: 158.
 35. Frolov A.K., Litvinenko R.A., Fedotov E.R (2013) Study of immunotropic hirudotherapy. The first World Congress of Hirudotherapy. Moscow.24-25 September 2013. These reports 119-120.
 36. Mehta P, Mc Auly D.F., Brown M., Emilie Sanchez, Rachel S Tattersall, et al. (2020) COVID-19: consider cytokine storm syndromes and immunosuppression. Lancet 395: 1033-1034.
 37. Krashenyuk A.I., Frolov D.I (2001) Acoustic emission - the basis of the energy information effect of hirudotherapy. Practical and Experimental Hirudology: Results for the Decade (1991 - 2001).
 38. Krashenyuk A.I., Krashenyuk S.V., Korotkov K.G., Frolov D.I. The ripple effects of medical leeches. "International Center for Medical Leech." Hirudotherapy and hirudopharmacotherapy. Edited by Dr. D.B.N. Nikonov G.I., 2002, Volume 4: 79 -96.
 39. Krashenyuk A.I., Dulnev G.N., Tonkov V.V., S.M.Nikandrova, I.A. Vetrova, et al. (2010) "Aquacommunicative effect of ultraviolet radiation and the phenomenon of remote transmission of this effect from person to person." In the : "Science. Information. Consciousness. " Theses of the 14th International Congress on Bioelectricography. St.-Petersburg, July 3-4, 2010, 27.