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COVID-19: SYSTEMS TRANSDISCIPLINARY GENERALIZATION, TECHNICAL AND TECHNOLOGICAL IDEAS, AND SOLUTIONS

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ABSTRACT

Aim/Purpose The Covid-19 pandemic has created many adverse effects. It overloads the healthcare system, causes deaths, and angers some at anti-covid restrictions. This study examines the feasibility of using technical and technological ideas to overcome these effects. The solution is based on new knowledge about the virus, its nature, formation, and activation in the environment.

Background The rapid spread of a new coronavirus infection is taking place against the background of a lack of time required to create new treatment scenarios for the disease, development, production, and vaccine safety research. In such a situation, it became necessary to gain this time for organizing and conducting events that could reduce the burden on the healthcare system.

Methodology The science that studies the morphology, physiology, genetics, ecology, and evolution of viruses is virology. The modern development of virology is moving towards a more accurate and comprehensive description of the mechanisms of interaction of viruses with the host organism. This contributed to the emergence of genomics, transcriptomics, proteomics, and immunomics. However, in virology, there is no particular discipline that sets itself three fundamental goals: to substantiate a single concept of the emergence of viruses; to study the natural mechanisms of formation of virus molecules in the environment; to describe the natural mechanisms of activation of certain viruses in the environment that cause viral pandemics. As a result, there are many articles among the published scientific articles on viruses dealing with the mechanisms of interaction of viruses with the host organism. However, there are no articles on the

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natural mechanisms of formation and activation of certain viruses in the environment. In the absence of such specialized articles, we were forced to use the method of systems transdisciplinary generalization of disciplinary knowledge to achieve our article's purpose. Generalization created new knowledge about the nature of viruses, about the mechanisms of their formation and activation in the environment and cells of biological organisms. It is logical to assume that to synchronize the state of biological objects of all functional ensembles on the planet, it is necessary to create and activate appropriate "technological tools." We have suggested and proved that RNA viruses play the role of such tools. Piezoelectricity activates viruses. It occurs during the compression and stretching of sedimentary rocks and bases of continental plates in different territories.

Contribution	The systems transdisciplinary generalization of the knowledge of scientific disciplines made it possible to edit the concept of viruses, to eliminate stereotypes that arose due to the use of unsuccessful analogies. As a result of this generalization, it was possible to prove that viruses are not intracellular parasites. The virus is a "technological tool" of the planetary organizing component. This "tool" aims to correct the genetic programs of organisms of all functional ensembles (plants, animals, people), which will maintain the state of organisms and the parameters of their metabolism in changing environmental conditions.
Findings	The viruses that triggered pandemics in the 20th century and early 21st century are RNA viruses. RNA molecules play the role of "technological tools" that the planetary organizing component uses to carry out short-term and long-term adjustments and constant support of the genetic programs of biological organisms. Therefore, in such a situation, it is advisable to talk not about the fight against the virus but only about eliminating the negative manifestations of the Covid-19 pandemic: reducing the number of people in need of emergency hospitalization, eliminating cases of the acute course of the disease and deaths. It is proposed to use certain technical and technological ideas and solutions to eliminate these negative manifestations.
Recommendations for Practitioners	Some scientists claim that the SARS-CoV-2 coronavirus will be active for a long time. In such circumstances, it is essential to ensure the safety of medical workers who work in covid hospitals, and every day they risk getting sick and dying. Therefore, the proposed technical and technological ideas and solutions can be used, among other things, to solve this problem.
Recommendations for Researchers	This paper recommends that researchers use new interdisciplinary and transdisciplinary approaches. They challenge assumptions and conclusions about the nature of viruses, and the mechanisms of their formation and activation in the environment can initiate. Such new research might describe the mechanisms that form and activate viruses in the environment and the body's cells. They also might provide practical use of this knowledge to eliminate the multiple speculations and fears that arise against the background of reports of the likely appearance of more deadly viruses and viral infections.
Impact on Society	Viral pandemics negatively affect society's quality of life: economic ties and the established way of life are disrupted. The proposed technical and technological solutions will significantly reduce this influence and eliminate society's discontent by those annoyed with the periodically introduced anti-covid restrictions.
Future Research	The results of a systems transdisciplinary generalization of disciplinary knowledge about the nature and purpose of viruses are essential for expanding the horizon of the scientific worldview. Future fundamental research on the

mechanisms of objective organizing constituents, a general description given in this article, will contribute to a deeper understanding of chemical and biological evolution mechanisms in which modern humanity is involved. In due time, such an understanding will allow a new look at the existing scenarios of the world socio-economic order, explore and describe new principles of sustainable development of society.

Keywords

Covid-19, SARS-CoV-2, transdisciplinarity, systems thinking, systems transdisciplinary approach

INTRODUCTION

One of the main problems accompanying the Covid-19 pandemic is the congestion of the healthcare system. Congestion is due to increased hospitalizations and deaths (Centers for Disease Control and Prevention [CDC], 2022). Therefore, some experts argue that the most adequate response to infection is not so much therapeutic measures as reducing the rate of spread of the Covid-19 disease (Rebrova, et al., 2020).

The Covid-19 pandemic has specific characteristics. First, it is accompanied by a poorly predictable wave-like process of intensifying and declining in the number of infected. In addition, this process is accompanied by the emergence of new, more aggressive strains of the SARS-CoV-2 coronavirus (Centers for Disease Control and Prevention, 2021). Secondly, some parts of different countries' populations have a negative attitude to anti-covid restrictions taken by governments. These anti-covid restrictions often violate citizens' constitutional rights and freedoms (Gafurova, & Oryntaev, 2020). The current situation requires radical measures to be taken to gain time to allow science to study the SARS-CoV-2 coronavirus and create effective vaccines thoroughly. Time is needed to allow medicine to develop new treatment regimens for the disease; for governments to predict the intensity of the disease in the short and long term, thereby developing new schemes and ways to reduce the rate of spread of Covid-19.

The first knowledge about viruses appeared only at the end of the 19th century. Thanks to the mass media, this knowledge has become known to many ordinary people. To correctly assess this knowledge, it must be considered in the context of global processes of directed transformation of primary planetary matter.

This article first presents and generalizes the knowledge of scientific disciplines that study these global processes. The "literature review" section allows the reader to get an idea of the scale of scientific activities of scientists and specialists studying SARS-CoV-2 coronavirus and looking for a solution to the problem of the Covid-19 pandemic.

The "methodology" section provides information on nonbiological and biological processes of directed transformation of planetary matter, as well as the role of viruses in these processes.

Then, in the "formation and activation of viruses" section, the reviewed literature leads to a theoretical assumption formulated about the existence and principles of the mechanism of formation and activation of viruses in the environment.

Next, the paper presents a description of the practical confirmation of this theoretical assumption. The description leads to the proposed technical and technological solutions. These solutions supplement the current main methods of countering a viral pandemic – drugs and vaccination. The paper proposes that these technical and technological ideas and solutions should be used in two directions:

- To create an automated forecasting system to predict and detect the emergence of new viruses in specific locations. Doing so will provide governments with a timely warning; and

- To create special mobile devices, which, if necessary, will allow blocking the natural mechanisms of activation of the coronavirus in crowded places and covid hospitals.

The proposed solutions will help reduce the Covid-19 pandemic's harmful effects: the congestion of the healthcare system, the number of people in need of emergency hospitalization, deaths, and public dissatisfaction with the introduction of anti-covid restrictions.

LITERATURE REVIEW

Publications on the SARS-CoV-2 coronavirus and the Covid-19 pandemic can be roughly divided into two groups. The first group includes review articles. Such articles describe the basic virology of SARS-CoV-2, such as genomic characteristics and receptor use, highlighting its key difference from previously known coronaviruses (Boldyreva, 2020; Borges do Nascimento et al., 2021; Chams et al., 2020; Holmes et al., 2021; Hu et al., 2021; Pandey et al., 2021; Pathak, 2021; Sharma et al., 2021).

The second group includes discipline-specific articles and studies of the SARS-CoV-2 coronavirus and the Covid-19 pandemic. Such publications accumulate and provide scientists and specialists with Internet resources (Elsevier, 2021; Springer nature group, 2021; World Health Organization, 2021). Articles and research are collected on many specialized resource centers (European Covid-19 Data Platform, 2021; Frontiers, 2021; Lancet, 2021; National Library of Medicine, 2021).

Analyzing these publications, we conclude that disciplinary methodologies are designed to study the virus's specific quantitative and qualitative characteristics, namely the mechanisms of its activity in the body's cells. These studies usually do not consider the influence of the environment, and such studies are numerous. The total number of such articles today reaches hundreds of thousands.

However, in virology, there is no single discipline with three fundamental goals: to substantiate a single concept of the emergence of viruses; to study the natural mechanisms of formation of virus molecules in the environment; and to describe the natural mechanisms of activation of certain viruses in the environment that cause viral pandemics.

As a result, there are many scientific articles on the mechanisms of interaction of viruses with the host organism. However, there are no articles on the natural mechanisms of formation and activation of certain viruses in the environment. At the same time, the published articles have a different level of scientific rigor and reliability (Shapira, 2020).

METHODOLOGY

In such a situation, we decided to use systems transdisciplinary generalization of disciplinary knowledge (Mokiy, 2019a) as the methodology. This research methodology aims to study the general characteristics of the virus, how it is formed and activated in nature and in the body's cells. In our opinion, the results of such a study can play the role of a system-forming factor for a variety of disciplinary, interdisciplinary and transdisciplinary studies and increase the level of their scientific rigor and reliability.

Defining and understanding the environment and nature of the SARS-CoV-2 coronavirus requires a systems transdisciplinary approach study that is visual and convincing.

TRANSDISCIPLINARY IMAGE OF THE ENVIRONMENT

Within the systematic transdisciplinary approach framework, the image of the environment is associated with a single chemical evolution of cosmic matter (Malaterre, 2015). Two main processes are distinguished: a nonbiological process and a biological process of purposeful transforming planetary matter.

Nonbiological process

A set of four-processes represents the nonbiological process:

- the process of transformation of primary planetary matter, which is accompanied by the formation of the iron core of the planet (Wood et al., 2006);
- the process of formation of the earth's crust and continental plates from matter that erupts onto the surface of the planet (Hawkesworth et al., 2020);
- the process of formation of the planet's atmosphere (Hayes, 2020); and
- the formation of sedimentary rocks that today cover continental plates with a multi-meter layer (Sellely, 2005).

It is important to note that in the process of accumulation of sedimentary rocks, non-biological processes of the formation of the so-called special molecules (the molecules-highest values) took place and continue to occur in them. These molecules are so named because they have characteristics and properties that are of exceptional importance for the further transformation of planetary matter.

First, these molecules personify the codes of the sequences of individual operations (steps, stages, cycles, basic and catalytic reactions) of transforming the matter that created them.

Secondly, they embody the codes of the structure and sequence of the construction of organisms. This helps in the transformation. Four nitrogenous bases (uracil, cytosine, adenine, and guanine) form the basis of nucleotides, polynucleotide molecules, including RNA molecules. They began to form inside the pores of lava and sedimentary rocks, inside coacervate drops, as well as on mineral substrates of some sedimentary rocks – layered silicates, clay minerals, etc. at the end of abiogenic processes (Elinov, 1989; Jahontova, & Zvereva, 2000; Kearns-Smith, 1985). On this basis, a paradoxical conclusion can be drawn that at the end of each stage of the transformation of planetary matter, the planetary matter itself forms “technological schemes” and “working tools” for its subsequent transformation.

Biological process

The biological process takes place with the participation of living organisms – from unicellular to multicellular organisms. An organism refers to a living being with an organized structure that can respond to stimuli, multiply, grow, adapt and maintain homeostasis. Therefore, an organism can be any animal, plant, fungus, protist, bacterium, or archaea on the planet (Biology online, n.d.). All organisms are natural elements of planetary nature. The primary purpose of organisms is to transform planetary matter, which erupts onto the planet's surface and results from nonbiological transformation processes. A feature of biological processes is that each transformational stage occurs with certain types of organisms, from unicellular to multicellular organisms. Moreover, the excess of a certain amount of transformed matter by the existing species(s) of organisms provokes a new type(s) of organisms.

Organisms form various connections with organisms of their own and other species to fulfill their purpose. A collection of objects of the same type is called a horizontal functional ensemble. A collection of objects of many horizontal functional ensembles is called a vertical functional ensemble. Functional ensembles need to control the results of their activities and synchronize these results in time. The role of such “controllers” and “synchronizers” is played by the so-called “extra-planetary organizing component” and “planetary organizing component” (Mokiy, & Lukyanova, 2021).

The role of the extra-planetary organizing component is played by natural mechanisms that use the broadband radiation of the sun. For example, organic substances that are formed by abiogenic synthesis, including polynucleotides (large RNAs) and polypeptides (proteins), are participants in a continuous objective selection process in which the most significant potential for evolution was obtained and continue to receive structurally stable polar molecules, the size of which provides resonance with

long-wave UV radiation from the sun (Chirkova, 1999). The role of the planetary organizing component is played by natural mechanisms that use the gravitational, electric, and electromagnetic fields of the planet arising from its tectonic activity. This disciplinary knowledge allows us to consider the mechanisms that create and activate the molecules involved in the biological processes of the transformation of planetary matter. Molecules stand out among these molecules: messenger RNA (“technological schemes”) and various types of small RNA (“working tools”) of the biological process of transforming planetary matter.

Viruses as “working tools” of the planetary organizing component

Different schools of thought, textbooks, and researchers have different answers to the question, “what is a virus?” The virus is often called an intracellular parasite or microscopic infectious agent (Krug & Wagner, 2020; Luria & Darnell, 1970). However, viruses are not intracellular parasites (Moelling, 2012). A parasite is, first of all, an organism that exists in close trophic connection with organisms of other species, constantly lives on them or in them, and also feeds on their juices and tissues (Poulin, 2007). All organisms have one ancestor (Theobald, 2010). Viruses do not have an ancestor (Harris & Colin, 2021).

The history of the RNA molecule, which forms the basis of many viruses, has its roots in the ancient “world of RNA” (Higgs, & Lehman, 2015). In such a world, metabolism (a set of directed chemical reactions) under the influence of the forces of the planetary organizing component ended with the formation of molecules of higher values (small RNA molecules formed in an abiogenic way). The value of these molecules was that they mirrored the sequences of the metabolic process. This assumption is supported by the fact that small molecules are involved in many enzymatic reactions – the so-called cofactors (components necessary for the work of specific enzymes). These molecules contain RNA nucleotides with unknown functions (Shapiro, 2007).

There are two popular theories: viruses are either degenerate cells or vagrant genes. Just as fleas are descended from flies by loss of wings, viruses may be derived from pro- or eukaryotic cells that have dispensed many of their cellular functions (degeneracy). Alternatively, some nucleic acid might have been transferred accidentally into a cell of a different species (e.g., through a wound or by sexual contact) and, instead of being degraded, as would normally be the case, might have survived and replicated (escape). Although half a century has elapsed since these two theories were first proposed, we still do not have any firm indications if either, or both, are correct (Dimmock et al., 2007; Wessner, 2010).

Such definitions form in our minds a negative attitude towards viruses. However, there is information that can refute such definitions of viruses. In this case, suffice it to say that in the free water area of the World Ocean, the population of viruses reaches an astronomical size, 10^{31} , which makes viruses the largest reservoir of genes on our planet. The virus distribution area covers all types of ecological niches - aerobic and anaerobic, oligotrophic and eutrophic, comfortable and causing physiological stress, including niches characterized by extreme temperature, pH, salinity, and hydrostatic pressure. The concentration of viruses in such niches, for example, in salt lakes, reaches 10^9 particles per 1 ml. Viruses have been found in representatives of all major groups of organisms – bacteria and archaea (Pinevich et al., 2020).

It is essential to say that 8-10% of the Homo sapiens genome are integrated sequences of retroviruses, which indirectly indicates their role in human evolution. We are talking about relict retroviral sequences – the so-called endogenous retroviruses that quietly sit in our cells. These retroviruses are traces of past encounters of organisms with viruses such as HIV and others. Millions of years ago, they attacked the cells of the then living organisms. If the body did not die but successfully coped with the viral attack, the viruses in the “disassembled” (deactivated) state remained in the cells, having lost their ability to infect. If the cells of the reproductive line were infected with the virus, the endogenous retrovirus was transmitted from generation to generation. In this way, the change travels through the genomes for millions of years. After decoding the nucleotide sequence of the DNA of

many animals, including humans, it became possible to find out exactly where these remnants of ancient viruses are located in the genome. It turned out that they are all in the genomes in strictly defined places. Some are characteristic only of humans or cats and are not found in other animals. Other retroviruses can be found in the same place, for example, in the genomes of gorillas, chimpanzees, orangutans, and humans. In the context of hypotheses based on the results of the analysis of viral nucleic acids and proteins, viruses played a vital role in the origin of DNA and the mechanism of its replication, and the evolutionary formation of the cell nucleus (Rzheshevsky, 2015).

In addition to the remnants of retroviruses, introns are other vital genome units. An intron is a non-RNA coding insert between DNA regions that code for a protein. Introns separate these regions and can adjust the intensity of protein assembly and some of its quantitative and qualitative characteristics. Introns are usually selected from the Noncoding DNA “library.” This library itself is formed from the remains of viruses (Rearick et al., 2011). It should be recalled that the size of the coding region of DNA (Non-coding DNA) can reach 98% of the genome of modern organisms (MedlinePlus, n.d.).

Finally, a few words about immunity: scientists explain that there are no ready-made antibody genes in the human genome, but there is a set of blanks. The antibody gene is assembled from three pieces. There are hundreds of variants of the first piece, several dozen variants of the second piece, and several variants of the third, which must be assembled in the genome. Therefore, these pieces are cut and glued into a working gene in each lymphocyte, and an antibody is already synthesized from it. This is how the genome is edited. However, who performs these operations – cutting, moving? Proteins do this, also borrowed from mobile genetic elements – from viruses. There are so-called transposons – this is a long-time “tamed” virus that has lost the ability to be transmitted between organisms. These viruses are transmitted only from parents to descendants, but some retain their mobility within the genome. Transposons make up 30% to 40% of our genome. If we add up with 8-10% retrotransposons, up to 50% of our genome is of viral origin (Markov, 2007).

Thus, viruses are one of the most critical components of the biosphere. To paraphrase the metaphor of the famous English virologist D. Bamford, we can say that the global tree of cellular life is lost in the ocean of viruses.

MECHANISMS OF VIRUS FORMATION AND ACTIVATION

Geologists say that the planet became “alive” with the beginning of its tectonic activity. It is logical to assume that the state of the participants in horizontal and vertical functional ensembles should be constantly brought into line with the state of tectonic activity of the planet and its continental plates. It is necessary to create and activate the appropriate “working tools” in the environment, the role of which RNA viruses play to carry out such an adjustment promptly.

As mentioned above, viruses have the goal when entering the body of saturating the cell genome with new functional and mobile blocks. These blocks must form or integrate into specific introns, thereby promptly changing the characteristics of proteins and the organism as a whole. If the increase or decrease in tectonic activity is prolonged, then the fragments of RNA viruses will turn into fragments of Noncoding DNA.

This version can be supplemented by the fact that all viruses should be divided into viruses that correct the state of organisms of horizontal functional ensembles, for example, only unicellular (bacteria), only plants, only animals, or only people. In this case, plant viruses will be harmless to humans. Another group of viruses aims to correct the state of objects of vertical functional ensembles. In this case, the transmission of viruses between objects of all horizontal functional ensembles should be observed. For example, the transmission of active viruses from animals to humans will be observed. Thus, we have come to the need to explain the mechanism of the formation and activation of viruses in the environment and in the body, which is associated with the planetary organizing

component. Therefore, we will seek the answer to this question not in virology, parasitology, or biology but in geology.

MECHANISM OF THE FORMATION AND RELEASE OF VIRUSES INTO THE ENVIRONMENT

It was said above that nucleotides and small RNAs composed of these nucleotides were formed and continue to form inside the pores of lava and sedimentary rocks, inside coacervate drops, and on the mineral substrates of some sedimentary rocks. These lava and sedimentary rocks are actively formed during convective cycles. Convective currents penetrate the entire mantle from the surface of the core to the asthenosphere. The movements of the mantle material in the upper layer of convective cells drag the lithospheric plates along with the continents “soldered” in them, forcing them to move horizontally from the areas of rising to the areas of subsidence of the mantle material. Experts can reconstruct the outlines of mantle convective cells from the horizontal displacements of lithospheric plates. The first and most straightforward case is one convective cell. It covers the whole mantle, with one pole of the rise of matter and one pole of sinking, causing the movement of lithospheric plates from the “pole of rise” to the “pole of sinking.” This movement caused the origin of the supercontinent (Sorokhtin, 1974). The next most complex case is a pair of convective cells, with two poles of subsidence of matter and a zone of uplift, separated by a global “seam” of mid-ocean ridges. Considering the alternation of single-cell and two-cell convective structures in the mantle and geological data on the time of the formation of supercontinents, it was found that 6.58 convective cycles have been completed so far. These calculations indicate that by the time humans appeared as a zoological species, a two-cell convective structure was formed on the planet and still exists today (Sorokhtin & Ushakov, 2002). The outlines of this structure in projection onto the planet’s surface are shown in the diagram (see Figure 1).

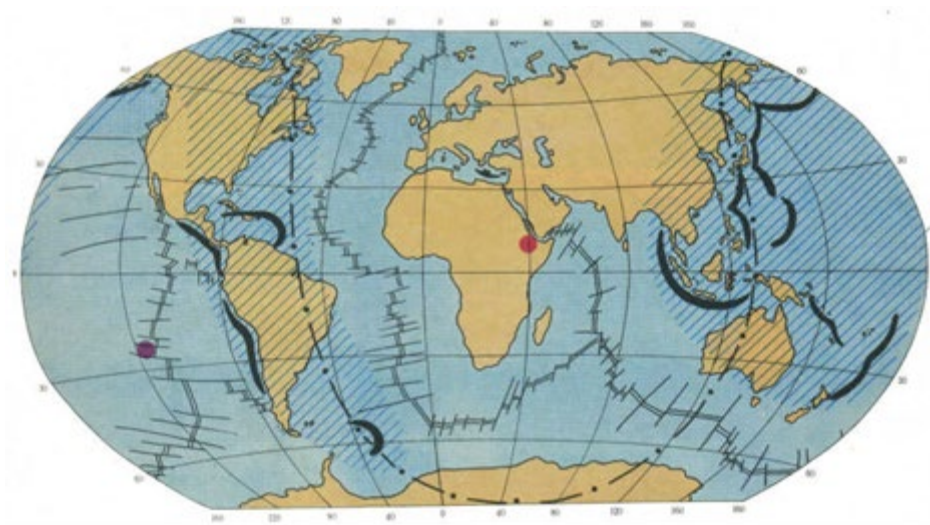


Figure 1. Schematic of the probable location of mantle flows. Red dots are the centers of the ascending mantle flows; unshaded areas – the hot ascending mantle flows areas; shaded areas – the cold descending mantle flows areas (based on Sorokhtin, 1974)

In zones of ascending mantle flows, continental plates and their territorial fragments will feel the force of constant compression. In zones of descending mantle flows, continental plates and their fragments will feel the force of constant stretching. The compressive and stretching forces results can be seen on exposed mountain slopes, exhibiting deformed sedimentary strata (see Figure 2).



Figure 2. The results of compression and stretching of sedimentary rocks

Probably, it is these forces of compression and stretching that are the basis of the mechanism of the planetary organizing component. Figuratively speaking, these forces direct the work of the “factory” to produce and release RNA molecules and RNA viruses into the environment. The device demonstrates the principle of operation of this “factory” for brewing tea – “French press” (see Figure 3). When the piston moves downward, compression forces arise in the glass.

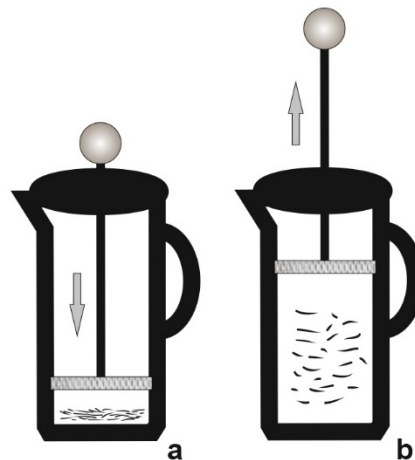


Figure 3. The behavior of tea leaves in a French press teapot

These forces push the tea leaves into the bottom (see Figure 3a). When the piston moves upwards, stretching forces arise in the glass. Under the influence of these forces, tea leaves rise from the bottom and become active (see Figure 3b).

Following this example, it can be assumed that stretching forces will act in the descending mantle flows zones. These forces contributed and will continue to promote the active release of new RNA viruses from the pores of lava and sedimentary rocks into the environment. This is confirmed by the fact that the first detection of viruses that caused eight viral infections in the 20th and 21st centuries, which grew into a pandemic, occurred in the territories of countries that are located in zones of descending mantle flows (countries of North and South America, Southeast Asia, Australia, and China; List of epidemics, n.d.) shown in Figure 4.

On the contrary, the compression forces will be more active in the zones of ascending mantle flow (countries of Africa, Asia, and Europe). These forces will stop the release of new viruses from the pores of lava and sedimentary rocks, but they will contribute to the formation of new strains of known viruses (Variants of SARS-CoV-2, n.d.) as shown in Figure 5.

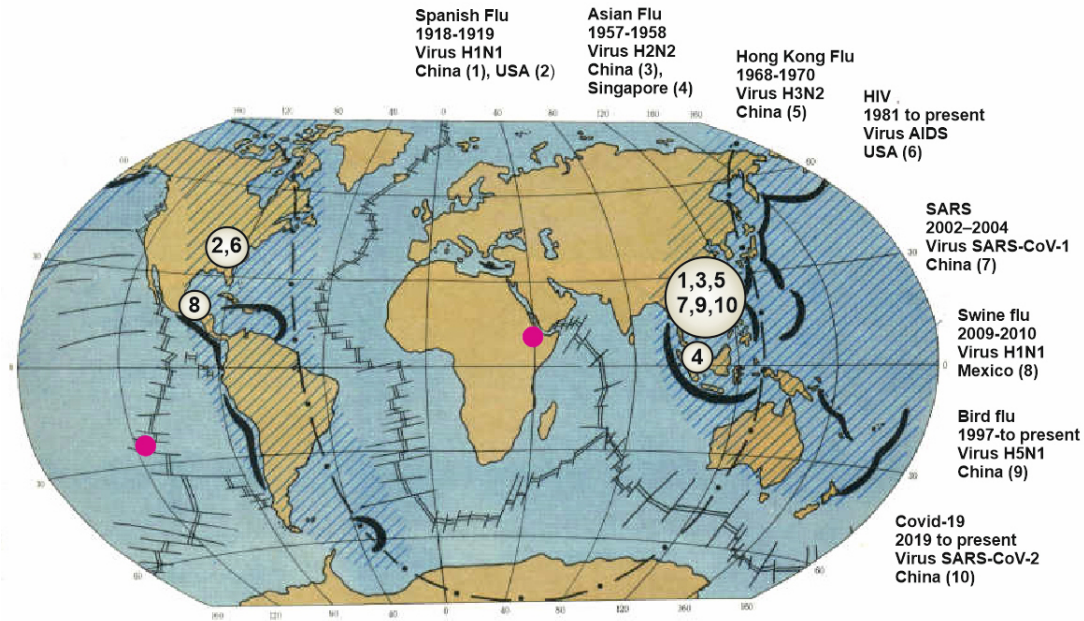


Figure 4. Zones of the first appearance of viruses that caused viral pandemics in the 20th and 21st centuries (based on Sorokhtin, 1974)

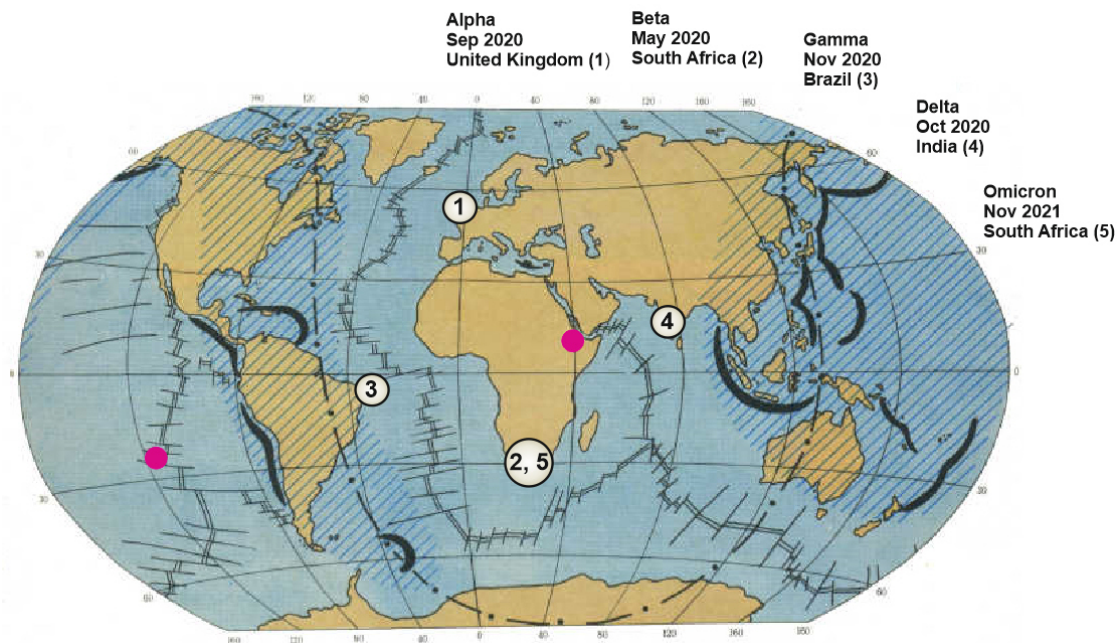


Figure 5. Zones of the first appearance of new variants of SARS-CoV-2 in 2020 and 2021 (based on Sorokhtin, 1974)

MECHANISM OF ACTIVATION OF VIRUSES IN THE ENVIRONMENT

The impact of compression and stretching forces on the bases of continental plates and sedimentary rocks leads to the emergence of the piezoelectric effect. Recall that piezoelectricity is the ability of

certain crystalline materials, including biological substances such as bone, DNA, and various proteins, to create an electrical charge. Moreover, the magnitude of this electric charge is proportional to the mechanical stress (Sekhar et al., 2021).

Consequently, it is enough for the forces of compression and stretching caused by the impulse of the movement of continental plates and their territories to exceed a particular value, as this will inevitably lead to the appearance of an electric charge on the molecules of RNA and RNA viruses that are in the environment and the cells of organisms. Simply put, individual fragments of the virus or the entire virus molecule will become active. In turn, DNA molecules and proteins of cell membranes will also react to this electrical charge. As a result, all intracellular biochemical processes of the body will be covered by a general purposeful adjustment.

This version of the formation and activation of the virus in the environment and the cells of organisms might have remained a version, but it received unexpected practical confirmation. In 2008 at the Institute of Transdisciplinary Technologies (Russia) (<http://td-science.ru/>), a hardware-analytical complex was developed. The basis of the complex is dosimeters – special devices, each of which can determine the state of the piezoelectric field in a given area (50 km²) and transmit this information every three hours in an autonomous mode via cellular communication to the main computer (see Figure 6).



Figure 6. The appearance of the dosimeter (with the cover removed)

The host computer's analytical program can process this information and present it in a graph (Mokiy, 2019b). From 2009 to the present, this complex has been operating in a test mode in the foothill region of the Kabardino-Balkarian Republic (Caucasus, Russia). From a geophysical point of view, the Caucasus forms a broad zone of deformation, which is part of the collision belt of continental plates from the Alps to the Himalayas. The region's architectonics is shaped by the movement of the Arabian plate northward to the Eurasian plate. The Eurasian plate moves about a few centimeters each year, pressed by the Arabian plate. Therefore, the state of the republic's territory can adequately reflect the general trend of changes in the planet's tectonic activity and its main tectonic plates.

In preparing this article, we combined the graph of SARS-CoV-2 coronavirus infected in the Kabardino-Balkarian Republic by days during the first wave and the beginning of the second wave of Covid-19 with the graph of changes in the state of the territory of this republic by days (see Figure 7). The configurations of trend line these graphs coincided. This fact confirms that the periodic increase in the stretching force and compression of sedimentary rocks in this area, along with other factors, is the main factor determining the activity of the virus SARS-CoV-2.

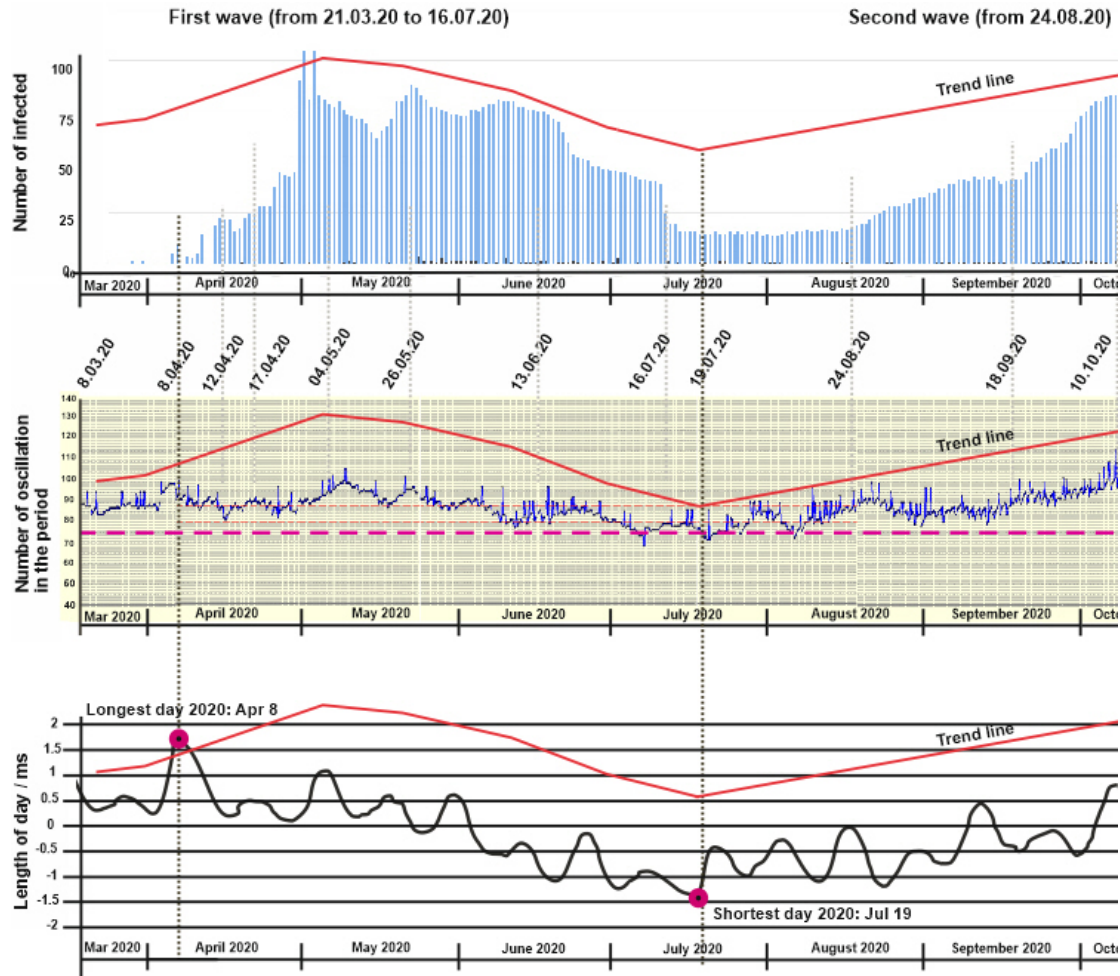


Figure 7. The number of people infected with coronavirus SARS-CoV-2 in the Kabardino-Balkarian Republic (Russia) by days from March 8, 2020, to October 15, 2020 (top graph)
 (based on <https://gogov.ru/covid-19/kbr/>)
Change in the state of the piezoelectric field of the territory of this republic by days from March 8, 2020, to October 15, 2020 (graph in the middle)
The earth's rotation speed by days from March 8, 2020, to October 15, 2020 (lower graph)
 (based on Jones, & Bikos, 2020)

The red dashed line in the middle of the second graph represents the highest compressive and tensile forces in sedimentary rocks in this area in 2008 and 2009. This means that the natural activation of the SARS-CoV-2 coronavirus became possible after the formation of increased values of the compressive and stretching forces of sedimentary rocks on the republic's territory. This feature probably explains the sudden activation of viruses and the sudden shutdown of their activity in different countries and on the planet as a whole. This discovery will allow in the near future to compile a classification of the threshold values of the piezoelectric fields of the activation of certain viruses in the territory of countries located in zones experiencing a stretching force (see Figure 4).

The main feature of the Covid-19 pandemic is its undulating activity. This activity can be observed on a graph of daily infections worldwide (see Figure 8, top graph).

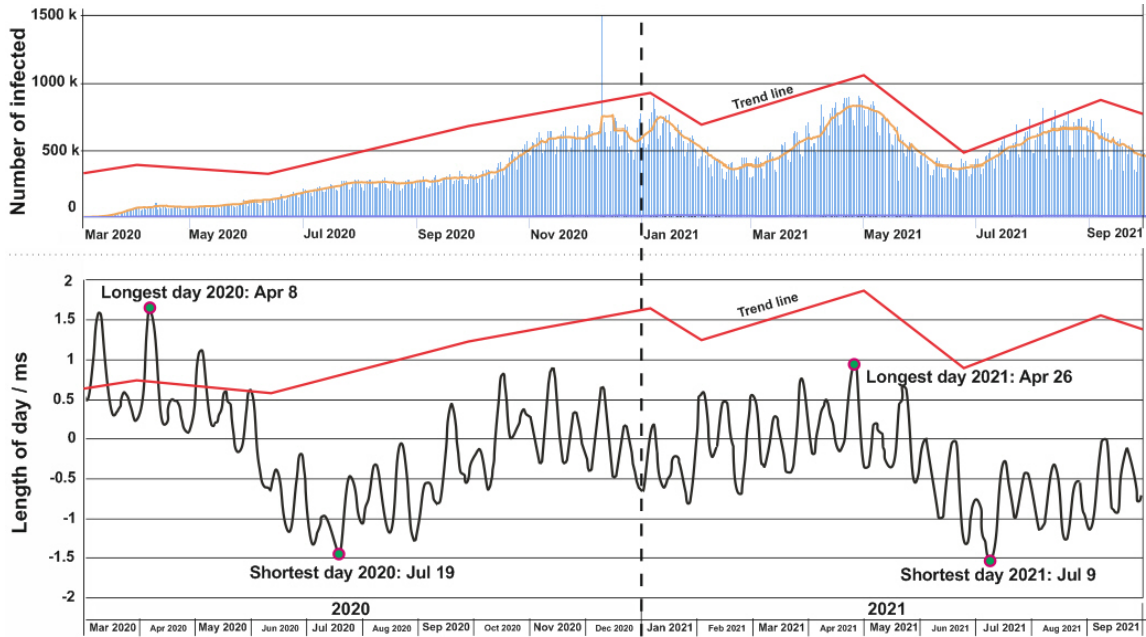


Figure 8. Statistics of Covid-19 in the world for all time (top graph)

(based on <https://gogov.ru/covid-19/world>)

The earth's rotation speed by days from March 8, 2020, to October 15, 2021 (lower graph)

(based on Jones, & Bikos, 2021)

In this graph, the first and second waves of 2020 are followed by three waves of 2021. Following the above assumption, this activity is due to the same undulating increase in the forces of compressive and stretching, provoked by the planet's tectonic activity. Among the factors that can influence this activity, there may be a change in the nature of the movement of the planet's convective currents. We know that when a skater puts his hands on his torso, he spins faster. When he spreads his arms, his rotation slows down. However, the earth has no arms but hot mantle updrafts. When the earth pulls "these arms aside," the heat of the upward mantle flow moves closer to the base of the continental plates, which are experiencing compressive forces (see Figure 1, open areas). Probably, it is this additional heating of the continental plates that causes the occurrence of massive annual fires in the countries of Europe, Russia, the western regions of the United States, and the southern regions of Australia. It also causes an increase in temperature in Antarctica. Consequently, this tectonic event may be the primary cause of global warming, which successfully mimics the results of the activities of modern human society.

According to scientists' observations, until the beginning of 2020, the shortest day since 1973 was July 5, 2005, when the earth's rotation time by 1.0516 milliseconds was less than 86,400 seconds (the number of seconds in 1 day). In the middle of 2020, when the second wave of the novel coronavirus pandemic began to form, the earth broke this record at least 28 times. The shortest day of all fell on July 19, during the beginning of the second wave of Covid-19, when the earth completed its rotation in 1.4602 milliseconds less than 86,400 seconds. Experts observing the earth's rotation rate in 2020 have suggested that the average day in 2021 will be about 0.2 ms shorter than 86,400 seconds (Jones & Bikos, 2020). In October 2021, graphs of the earth's rotation rate in 2020 and 2021 were published (Jones & Bikos, 2021). When combining these graphs (see Figure 6, lower graph) with the graphs of the infection of the world's population with the SARS-CoV-2 coronavirus (see Figure 6, top graph), their trend lines were found to coincide.

Thus, the wave-like nature of the Covid-19 pandemic demonstrated the wave-like nature of changes in the earth's rotation and the state of its tectonic activity. In turn, experts who had nothing to do with virology predicted an increase in the intensity of the Covid-19 pandemic in 2021.

Therefore, it is essential to pay attention to two things when forecasting pandemics. First, against the background of the general acceleration of the earth's rotation (period from 1850 to 1900), pandemics were mainly caused by bacteria (cholera, plague, smallpox, typhus). Second, against the background of a general slowdown in the earth's rotation (from 1900 to 2020), pandemics are mainly caused by viruses (see Figure 9).

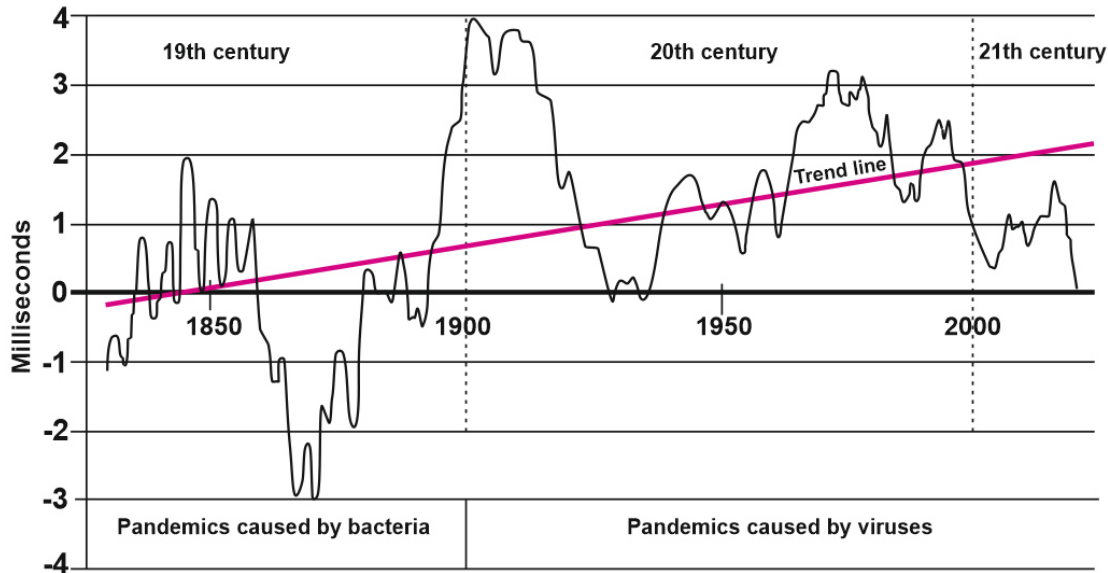


Figure 9. Length of day, 1830 to 2020 (based on Jones & Bikos, 2021)

This circumstance allows us to confidently say that if the earth accelerates its rotation during 2021-2022, then bacteria that can cause bacterial pandemics will be activated in the natural environment. However, if the trend of a general slowdown in the earth's rotation continues, then the activity of the SARS-CoV-2 coronavirus will also remain. Against this background, the likelihood of the formation and activation of new RNA viruses in the environment will remain. New viruses will provoke new viral pandemics.

TECHNICAL AND TECHNOLOGICAL IDEAS AND SOLUTIONS

The described mechanisms of the formation and activation of viruses in the environment and the body's cells make it possible to propose technical and technological ideas and solutions. One of the possible technological solutions can be the use of the existing hardware-analytical complex to create a global monitoring system for the state of the piezoelectric field of potentially hazardous territories, primarily China, South Korea, Japan, Southeast Asia countries, and North and South American countries (see Figure 4). The indicator devices of this complex can be configured to monitor the state of the piezoelectric field of certain zones within these territories or certain megacities. The governments of these countries can use the information from such a monitoring system to predict the likelihood of new viruses and increase the intensity of existing viral pandemics. As a result, governments will be informed promptly about the maximum probability of the appearance of a particular virus and the possible duration of its activity.

A further and deeper study of the natural mechanisms of virus activation in laboratories of interested research centers and universities will make it possible to use the theoretical and technical developments used to create a hardware-analytical complex to create a device capable of preventing a viral infection. This device will create the piezoelectric field of a specific configuration and strength. Hence, such an artificial field will block or significantly weaken the natural piezoelectric field arising under the forces of compression and stretching of bases of continental plates and their territories. Simply put, the use of such a device in crowded places – at stadiums, theaters and cinemas, shopping

centers, and universities – will turn off virus activity just like you turn off the lamp when you go to bed. The use of such devices will reduce the confrontation in society between the government, which develops measures to prevent viral infection, and people who do not want to follow these measures. Such devices will save the necessary time, reduce the number of infected people, reduce the burden on hospitals, and, which is important, preserve the health of doctors and alleviate the condition of patients who are in intensive care. Along with hygiene products, medicines and vaccines, this device can become an indispensable attribute of reducing the infectiousness of viruses in times of viral pandemics.

Another essential addition to the proposed technical and technological ideas and solutions will be to inform people in accessible forms about new concepts and knowledge that show the undeniable role that viruses play and continue to play in the development of humans and society. Modern people must learn to understand their planet. They must understand that viruses are “technological tools” that the planetary organizing component uses to achieve its goals. The directed development of man and society corresponds to these goals. Therefore, the virus does not cause much harm to healthy people. As a rule, people who have chronic diseases and weakened immune systems suffer and die from it. We cannot resist the planetary organizing component. We cannot make all people healthy. However, we can reduce the number of people infected and weaken the intensity of the manifestation of viral diseases. In the current conditions, this will lead to parity between the ethics of the planetary organizing component and the ethics of human society.

CONCLUSION

The problem is the distortion of the image of reality near the horizon of the existing scientific worldview. Therefore, to prevent viral pandemics, we must reach a new level of a scientific worldview. A systems transdisciplinary generalization of the trivial disciplinary knowledge of chemistry and biochemistry, physics and biophysics, biology and geology, virology, and planetology made it possible to form non-trivial knowledge about viruses and eliminate stereotypes about their use of unsuccessful analogies.

It was found that the new level of scientific worldview is an extension of the Gaia hypothesis. In the early 1970s, this hypothesis was formulated by E. Lovelock and L. Margulis (Boston, 2008). The Gaia hypothesis supposes earth to be a planet-scale-integrated entity composed of the nonliving parts of the planet plus its ecological systems – in essence, a superorganism. The entity is viewed as a self-regulatory system in which ecological and biological processes control the values of the many physical parameters of the earth within certain bounds that are conducive to the continuance of life. The concept has been attacked as unscientific, untestable, and unacceptably teleological. Alternatively, it has been lauded as a new insight into the behavior of large-scale complex systems. Therefore, the creators of the Gaia hypothesis hoped that future investigations of the intrinsic behaviors of complex systems might shed further light on whether the Gaian notions can be applied in nature to the ecological and physical systems of the earth. In this case, we have replaced the unscientific, unverifiable, and teleological metaphor “Earth as a superorganism” with the scientific and verifiable image “Earth as a single vertical functional ensemble.” The unity of such an ensemble is supported by a set of directed nonbiological (physicochemical) and biological processes of transformation of primary planetary matter, designated by the term “planetary organizing component.” In turn, viruses that form in the environment play the most critical role of “technological tools” of the planetary organizing component.

With the help of this tool, the planetary organizing component carries out short-term and long-term adjustment and continuous support of the genetic programs of biological organisms that form horizontal and vertical functional ensembles on the planet. In addition, it is vital for the planet that, in any case, the results of the transformation of planetary matter by all organisms do not differ from those expected. However, sometimes, organisms of some horizontal functional ensembles either can no longer carry out the metabolism, which contributes to obtaining such results, or they deliberately

do not want to do so. In this case, some functional ensembles undergo a renewal of the species composition. For example, in the world's oceans, lytic bacteriophages (viruses infecting bacterial cells) serve as the main regulator of the renewal of bacterial populations. Functional ensembles, consisting of multicellular organisms, often oppose their immunity to the action of the planetary organizing component. Immunity is guided by its organizing component, which plays the body's electric field. In such a situation, viruses, and in some cases bacteria, are the only technological tools that the planetary organizing component can use to make the necessary adjustments to the metabolism and state of proteins in multicellular organisms. This circumstance can influence both genetics and virology and aid society's socio-economic development.

It is important to remind ourselves that modern genetic engineering allows us to isolate genes from the cells of an organism, carry out special manipulations with these genes, and introduce them into other organisms. It is assumed that such manipulations can save humanity from dangerous diseases, the threat of hunger, and chronic malnutrition. However, it is now becoming apparent that a change in the genetic code of organisms (including humans) can sever the natural connection between the genome of cells and the environment. Simply put, in this case, the earth will lose the ability to promptly adjust the metabolism and state of proteins in genetically modified organisms under changing environmental conditions. Lack of such natural support in the future will inevitably lead to the extinction of genetically modified organisms.

A similar situation can be extrapolated to the socio-economic development of society. From a systemic transdisciplinary worldview, society is a horizontal functional ensemble that is part of a planetary vertical functional ensemble. Suppose we admit that the planetary organizing component corrects and supports the organisms of other horizontal functional ensembles, such as unicellular organisms, plants, and animals. Why do we not consider its influence on the development of human society? It was shown above that the planetary organizing component had a significant impact on the formation of the modern human genome, saturating it with the remains of ancient viruses. This means that the piezoelectric field of the deforming bases of continental plates and layers of sedimentary rocks gradually saturated the genome of the cells of human progenitors with viruses and viral residues and then supported their activity in the genome. Using the systematic transdisciplinary approach models, we were able to identify the order, the natural formation of the person himself, and the functional ensemble (human society) (Mokiy, & Lukyanova, 2019). Under this model, over the past 230,000 years, humanity has gone through two stages of development. During the first stage (229376-14336 years ago), the piezoelectric field of some continental plates and sedimentary rocks contributed to the formation of the main morphological characteristics of humans. Simply put, during that period, the planetary organizing component purposefully shaped the appearance of a modern person. In the second period (from 10752 BC to our time), the state of this piezoelectric field contributes to the formation of the characteristics of human higher nervous activity.

Simply put, modern society consists of people whose main characteristics and capabilities of the mind are still taking shape. For this reason, the population of different states and society, as a whole, commits unreasonable actions in the use of natural resources and international relations, opposes their activities to the activities of the planetary organizing component. In this case, it can be argued that viruses and, in some cases, bacteria, as technological tools of the planetary organizing component, will periodically "shake" human society until 2688. However, after each such "shaking" individual people and society as a whole will become more reasonable. Also, their practical and intellectual activities will become more reasonable. This explains that after each pandemic, people desire to rethink the previous stage of historical development, the nature of international relations, and the content of the models of the world socio-economic order.

Consequently, the sustainable development of society depends primarily on how soon we understand the ethics, mechanisms, and logic of the planetary organizing component and begin to bring socio-economic development in line with them. This is the main task of the society of the postform pe-

riod. Otherwise, the planetary organizing component will inevitably continue to purposefully influence the process and results of the development of the characteristics of the higher nervous activity of people through the formation and activation in the environment of the corresponding “technological tools” – more aggressive viruses. Simply put, the appearance and intensity of viral pandemics will depend, among other things, on how society will take into account the ethics, mechanisms, and logic of the planetary organizing component in each subsequent model of the world socio-economic order, including the one that is beginning to form today.

Coronavirus SARS-CoV-2 is an enveloped single-stranded RNA virus (Nicholas et al., 2020). The viruses that caused viral pandemics in the 20th and 21st centuries (see Figure 4) were RNA viruses (Bazykin & Stefanov, 2014). Now that the importance of RNA viruses in the evolution of life on the planet has been shown, there is no doubt that the planetary organizing component that created and activated this virus will still perform the necessary action. Fragments of this virus will surely replenish the library of noncoding DNA and existing introns (Yeung et al., 2007). Such a replenishment of the cell genome will probably preserve the life of biological objects of many functional ensembles, including humans, in the forthcoming environmental conditions. Therefore, in such a situation, it is advisable to talk only about the elimination of the negative manifestations of the Covid-19 pandemic: about reducing the number of those in need of emergency hospitalization, cases of acute illness, deaths, as well as public discontent from the implementation of anti-covid restrictions.

To achieve these goals, we propose to organize international cooperation of specialists from different disciplines. These interdisciplinary teams will address two major challenges. First, to study the mechanisms of formation and activation of viruses in the environment in detail. Secondly, in a short time, finalize and implement the proposed technical and technological ideas and solutions to reduce the severity of the problems associated with the covid-19 pandemic.

Speaking on May 27, 2021, at the 74th World Health Assembly of the World Health Organization, Director-General T.A. Ghebreyesus said:

We have come to a fork in the road. If we go on the same old way, we will get the same old result: a world that is unprepared, unsafe, and unfair. Make no mistake: this will not be the last time the world faces the threat of a pandemic. It is an evolutionary certainty that there will be another virus with the potential to be more transmissible and more deadly than this one. This is not the time for incremental improvements or tinkering at the edges. This is the moment for bold ideas, bold commitment, and bold leadership, for doing things that have never been done before (Ghebreyesus, 2021).

A systems transdisciplinary worldview allows us to understand the ethics, mechanisms, and logic of the planetary organizing component and technical and technological ideas and solutions to reduce the severity of the problems associated with the Covid-19 pandemic. It may become harbingers of this new path.

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