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REMOVE THE CROWN FROM THE VIRUS

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Antonio Guterres, Secretary-General of the United Nations on January 3, 2020, invited humanity to talk about the present and future of our planet. Thus began the largest ever global communication campaign dedicated to the 75th anniversary of the UN. Its idea is to hear the opinions of as many people as possible. Dialogues and research focus on three issues - the future of humanity, global trends and global cooperation.

The UN celebrates its 75th anniversary in the time of huge upheaval across the world. They are compounded by the unprecedented crisis in health care caused by the COVID-19 pandemic, with serious economic and social consequences. The situation changes every day. Global negative trends in demography, information, politics, military affairs, climate, ecology and technology have raised risks to a completely different level. New warnings are emerging: fires, floods, droughts, food shortages, wars and pandemics.

All of these are alarm signals, indicating that people's way of life is in danger, which is not a surprise for scientists, since they have been sounding the alarm for a long time. But threats from climate change, ecosystem collapse, loss of biological diversity and depletion of land and water resources must penetrate the mass social consciousness. We want to be heard and understood.

If you believe that the mind is a person's ability to comprehend the relationship between phenomena, then there were many wonderful minds on Earth who were able to catch among the phenomena of material life the most intimate connections of people with the world around them.

How did life begin?

As the great scientist of the East Abu Nasr al-Farabi said, "Wisdom is the knowledge of remote causes." That is why, when talking about the causes of the coronavirus pandemic that has hit the whole world, it is important to remember how life began on our Earth. The Universe singled it out from all the planets of the Galaxy, providing an opportunity to create living and intelligent beings. The seeds of life, transferred in the solar system from one cosmic body to another, surprisingly quickly adapted to earth conditions and created complex life forms.

In the universe, as you know, everything is created according to the laws of logic. The expansion of the Galaxy requires the creation of new star systems in order to form areal of intelligent life on its planets, which is assigned the role of an outpost for further space exploration. However, in order to create an areal of intelligent life, the Universe tries to foresee everything. Therefore, everything that a human uses - the atmosphere, soil, water, fauna and flora, various minerals - nature created in advance - before the appearance of people. At the same time, we need not forget that human is an accidental caprice of the great cosmos. This ethereal creature can disappear from the face of the Earth overnight, in the end. It all depends on our behavior.

Life on our Earth with all its manifestations has led to deepest changes in the development of the planet. Improving in the process of evolution, life forms spread more and more, taking part in the redistribution of energy and substances in the earth's crust, air and water envelopes. Thus, the origin and spread of vegetation led to a radical change in the atmosphere, which originally contained very little free oxygen and consisted mainly of carbon dioxide, methane and ammonia.

Plants that assimilate carbon from carbon dioxide have created an atmosphere containing free oxygen and only residual of carbon dioxide. Free oxygen in the air served not only as an active chemical agent, but also as a source of ozone, which blocked the path of short ultraviolet rays to the surface of our planet (ozone layer). A secondary atmosphere of the Earth was formed with a high content of oxygen. And carbon, accumulated for thousands of years in

the remains of plants, has formed energy reserves in the earth's crust in the form of deposits of organic compounds.

The development of life in the World's Ocean led to the creation of sedimentary rocks consisting of skeletons and other remains of marine organisms. These scales, their mechanical pressure, chemical and physical transformations have changed the surface of the earth's crust, thereby forming the soil. But the soil was not created in one day. Billions of years have passed since the primary film of warm and living soil formed on the bare stone hulk called the Earth planet.

Centuries and millennia have passed before newborn creatures in the form of microscopic growths of green color suddenly began to appear and crumble on the infant living film. They were replaced by great organisms with chrome green, able to survive in vortices of light and heat rays and even create a gaseous mixture of molecules of new substances, including oxygen.

It is even more difficult to imagine the safety of the newborn film, on the basis of which more organized and resistant vegetation appeared. It has already created a habitat for itself. More than that, it strengthened it, asking the green veil for a desperate job - to intercept the energy of the sun's rays, and using it to create new, more complex forms of living. Vegetation accumulated organic matter at such a rate that it would have swaddled with itself almost the entire lifeless stone earth, which, in one way or another, itself turned out to be an integral part of this organic formation.

It seems that there was no end to this still largely mysterious transition from dead matter to living matter; it seems that the process was proceeding with the greatest acceleration. The new organic matter mixed with the loosened earth, entered into irreversible changes with minerals, changed them, creating new molecules again, steadily increasing the volume and area of the pristine soil film. It became more complex, darkened and had already begun to nourish the delicate root hairs of plants, as a mother nursing her babies with milk.

More and more powerful and thickening forests moved from the shores of the seas into the depths of the continents. Amazing trees stretched to the sky, competing with each other in the power of the trunks, the strength of the branches, in the strength of the root system.

Dying, each tree left on the ground that raised it, a large amount of wood and green parts, hardly similar to modern leaves and branches. Forest remains, and later grasses, probably very large grasses, thickened and strengthened the soil layer by layer. In place of each of the fallen giants, a powerful coppice shoot immediately rose and stubbornly stretched upward. Already new species and forms of plants continued the process of soil formation, which became more and more diverse.

A significant layer of soil lay over the entire land area. This soil has climbed high into the mountains, anchored the river valleys and coastal seas, wrapped the continents in a warm blanket. Such "delicate skin" of the Earth became that all-embracing basis on which a variety of organic and intelligent life, associated with plant and animal life, with humanity arose. Heterotrophic organisms appeared not only in the sea, but also on land. Planet Earth has become a living being.

The evolution of life on Earth was accompanied by large-scale natural disasters - the movement of continents, the fall of meteorites, a series of powerful volcanic eruptions, during which five mass extinctions occurred over the past 500 million years, due to which up to 96% of living beings died. The development of organic life in vast territories of the globe was also suspended for many millennia because of the great glaciations caused by a change in the inclination of the earth's axis in relation to the sun, cloudiness of the atmosphere due to volcanic activity.

As we can see, life on Earth was created in several stages, underwent various cataclysms, until the first representatives of the species Homo sapiens appeared on the planet 100 thousand years ago. Humanity, thanks to its mind, has protected people from many diseases, increased life expectancy, that is, created favorable conditions for itself for existence, as a result of which an unlimited population growth occurred. According to UNESCO, if in 4,000 BC the population of the Earth was 7 million people, then in 2015 - 7.3 billion.

Mysteries of Mother Nature

The mysterious nature raises disturbing questions. What are viruses for? To keep humankind from unnecessary pride, recall that human is just one species of several million species that live on Earth. Viruses make up the majority. They appeared on our planet long before the arrival of Homo sapiens. They know how to wait, and then clearly indicate their presence. There are many such moments when nature shows human fragility. It will take a lot of time and effort to appreciate the highly complex adaptation mechanisms developed by viruses.

They have learned to deceive the human immune system: at first they pretend to be harmless, then they enter the human body to suppress its immune system. Over time, viruses can change so that they infect billions of people, and the drugs that were once used to fight them become useless.

How did it happen that in the 21st century all of humanity ended up in quarantine? It is striking that in a few months COVID-19 managed to show "who runs the house?". But people fly into space, they have fantastic technologies. And suddenly something microscopic appears, and the usual life collapses. After all, recently it seemed that all the contagious diseases that claimed millions of lives (plague, cholera, smallpox and others) were in the past. Humanity has experienced the invasion of great epidemics many times. Terrible diseases did not spare entire nations and each person individually.

As you know, on January 30, 2020, the World Health Organization (WHO) declared the outbreak of the COVID-19 epidemic an emergency of international importance. Reading news sites and posts, watching the rush buying of medicines, looking anxiously at the coughing passers-by, you feel like a character in a large-scale Hollywood blockbuster. And the signs of these days - remoteness, self-isolation, empty streets of cities and towns, quarantine with checks on the roads - until recently seemed just attributes of science fiction novels.

We started to forget family values. COVID-19 has shut us down in our homes so we can learn to live like a family again. In our everyday hustle and bustle, we had no time to communicate with our parents, and this insidious disease reminded us of how vulnerable they are. We stopped appreciating medical workers, and when we got sick, we realized how irreplaceable they are. We stopped respecting teachers - the pandemic closed schools so that parents could try to teach their children. Before the coronavirus, all their free time, people paid more attention to entertainment, rather than learning, communication and development. The pandemic has closed stadiums, cinema and concert halls, shopping and entertainment centers.

Now people have become more social than before - communication has just been moved online. Quarantine showed that before a global disaster, people try to support each other with kind words and deeds, they become more emotional. Although

the pandemic is raging in the world, residents of different continents do not despair, continue to somehow joke and sing. In a difficult time for the whole world, a sense of humor and mutual support save us. And nature during quarantine began to cleanse itself from the consequences of unreasonable human activity.

In the modern world of technology, one of the first remedies against coronavirus was a simple soap. Common laundry soap molecules destroy the COVID-19 membrane, like many other viruses. It is worth noting that soap is often destructive for microorganisms. A drop of regular soap diluted in water is enough to break up and kill many types of bacteria and viruses, including the coronavirus. The secret of the soap lies in its hybrid structure. It is composed of pin-shaped molecules, each with a hydro-profiled head that binds easily to water and a hydrophobic tail that avoids water and prefers to bind to oils and fats. In water, these molecules interact with other molecules and assemble into small bubbles called micelles.

Bacteria and viruses have lipid membranes that are littered with proteins. They allow viruses to infect cells and perform vital tasks for them. These include coronaviruses, HIV, viruses that cause B and C hepatitis, herpes, Ebola, Zika virus, Dengue and others that affect the intestines and respiratory tract.

When people wash their hands with soap and water, they surround any microorganisms on the skin with soap molecules. The hydrophobic tails of the soap molecules try to avoid water and in the process wedge themselves into the lipid membranes of the viruses, tearing them apart. Soap destroys the shell, kills the pathogen. And he can no longer harm the body. In addition, the soap molecules break down the chemical bonds that allow viruses to adhere to surfaces. Therefore, while rinsing your hands, all microorganisms that the soap has damaged or killed are washed off.

Global Principles of Health Protection

On October 1, 2018, the World Health Organization released the first global guidelines for sanitation and health. At the same time, it warned that in order to achieve the goal of achieving universal sanitation coverage by 2030, when everyone on the planet has access to toilets with safe excrement. Decisive shifts in countries' policies and increased investment for these purposes are needed. Every US dollar invested in sanitation will deliver nearly six times the return on health care costs, productivity gains, and premature deaths.

As noted by the WHO, without this, millions of people are denied the opportunity to maintain their dignity, be safe and use the toilet. Globally, 2.3 billion people lack basic sanitation (and almost half of them are forced to practice open defecation). They are among the 4.5 billion people who do not have access to toilets connected to a canalization, cesspool, or septic tank for egesta processing. Due to the increase in the number of people on the planet, the number of people not using latrines is also growing. Along with states that are safe in terms of the availability of sanitation and sewerage systems, there are countries where 10-25%, or even 50% of residents relieve themselves on the street.

Three out of ten people in the world (2.1 billion) do not have a safe and easily accessible water supply in their place of residence, and six people out of ten (4.5 billion) do not have safe sanitation facilities.

A pandemic is not just a big epidemic. This is a phenomenon of a qualitatively different order. Each new pandemic looks as if it takes into account the failures of the previous one and is at least one step ahead of the capabilities of science in this historical period. Quarantine has proven to be the only effective method of fighting the infection for centuries.

The great physician Ibn Sina, known in the West as Avicenna, suggested that diseases could be caused by some tiny creatures and anticipated many modern quarantine measures. In particular, during the plague pandemic, he refused to shake hands and gave advice on how to protect oneself from the black death. “Order a clean clothes and a vessel of vinegar to wash your face and hands,” wrote Avicenna. - This should become a custom of the country where the black death is rampant ... First of all, it is necessary to rid people of the fear of this disease. The Black Death is passed from person to person. It sticks to everything - to the hands, to the hair. Even children carry it around. Therefore, people cannot get together. Bazaars and mosques must be closed for a while. Let everyone pray at home. Let the merchants carry the goods home. Put the money in vessels with vinegar. The one who cares for the sick, let him wear cotton wool with vinegar and cover his mouth with this cotton wool, and let him keep wormwood leaves in his mouth. "

Currently, interest in viruses has grown immeasurably. It`s naturally. After all, the flow of information about viruses, their properties and variability accompanies, for example, every flu epidemic. The destruction of infectious diseases on the planet and the fight against cancer are associated with the research of virologists. Research practice shows that virus carriers are practically all living things that inhabit our planet.

Today we have information on about a thousand types of viruses. Of course, we know better than any other viruses that infect humans. About 500 species have been identified. They do not always manifest themselves in the same way. In some cases, viruses attack only certain types of living beings. For example, specific influenza viruses of pigs, cats, and seagulls have already been identified, affecting only these animals and safe for others.

Human, animals, insects, plants. Diseases are common to many species and highly specific. Why such a wide range of aggressive options? Under the influence of what conditions did these properties develop? How many viruses still exist in nature - specialized and universal? We have no idea of the answer to these questions yet.

Hypotheses, hypotheses

A lot of mysterious, unclear, or to be precise, not yet fully understood, is associated with viruses. Recognizing the existence of pathogens of infectious diseases, which are much smaller in size than bacteria, scientists for a long time could not come to a consensus: What are they? For example, viruses have discovered an amazing variety of carriers of hereditary information. All life on the Earth has one single such carrier - deoxyribonucleic acid - DNA (double-stranded). Moreover, DNA is always found in the body of any living being "in pair" together with another substance ribonucleic acid - RNA. And viruses have as many as six carriers of genetic information: four forms of DNA and two forms of RNA. In this case, viruses are always content with only one nucleic acid - DNA or RNA. Why?

There is a lot of unclear in modern hypotheses about the origin of viruses. So, some researchers believe that viruses are the descendants of ancient precellular life forms, frozen, stopped in their development at a certain stage. The diversity of the genetic substance, say the supporters of the hypothesis, reflects the course of evolution of these creatures. Nature, as it were, tested all possible variants of a hereditary substance on viruses, before settling on double-stranded DNA.

Viruses are the descendants of bacteria or other single-celled organisms, which for unknown reasons have reversed

in their development, degraded, other scientists say. Perhaps, their structure was once more complicated, but over time they have lost a lot. And their current state, including the variety of carriers of genetic information, only reflects the different levels of degradation reached by their various species.

Finally, there is a hypothesis according to which viruses are constituent parts of the cells of living beings, which for some unknown reason have become autonomous systems. The process of the emergence of viruses, according to this hypothesis, refers not only to ancient times, when they already existed, of course, but also to our time. In other words, this hypothesis recognizes the possibility of the ubiquitous continuous production of viruses by cellular elements. Is this possible, are the constituent parts of cells capable of becoming autonomous systems, and even capable of reproduction? Supporters of this hypothesis believe that this is possible.

Many cellular structures have relative autonomy. For example, the mitochondrion organelle, which is in charge of the energy balance of the cell, has its own genetic apparatus, and the cycle of its division is independent of the cycle of cell division. Genes also have a significant degree of autonomy. Among the constituent parts of the cell, one can find structures similar to the main types of the genetic apparatus of viruses.

More and more new arguments are found by researchers, confirming the hypothesis of "crazy genes", as it is sometimes called, not without irony. And this hypothesis looks much more convincing today than two decades ago at the time of its appearance.

Logic and paradoxes of the microworld, or the virus entry into cell

The structure of viruses is striking in its purely mathematical completeness, logic of symmetry. Hundreds of protein crystal-like structures are arranged in a tight spiral. The core of the filament, forming a helix, is a kind of capsule where the nucleic acid molecule is located. As a result, the general view of the virion is an extremely laconic cylinder, a hollow tube.

And here is another shape: icosahedron, the edges of which are formed by triangles. The main material from which the icosahedron is composed is the same protein structures. Inside is the cavity where the nucleic acid molecule rests. Both "minimal" (simply arranged) and other, much more complexly arranged viruses are always similar in one thing: their "nucleic center" - nucleoid is built according to one of the described two types - helical or cubic.

While studying viruses, researchers faced a most curious phenomenon that has no analogues in the world of living things. Is it possible to mechanically divide a living cell into parts, then reassemble it and make it not only come to life, but also function properly? "Minimal" viruses are capable of this. If you separate their protein envelopes from the nucleic acid, in other words, turn them into protein "fragments" and a nucleic mass, and then mix these two substances, then the original mature viruses-virions with their geometrically correct structure and previous infectious properties will reappear.

Viruses are representatives of living nature, that is, not substances, but creatures. True, the creatures are extremely peculiar, leading a purely parasitic lifestyle. Parasitism, that is, the existence of one organism at the expense of another, is a phenomenon that is very common in nature. Blood-sucking insects - mites, lice, aphids living on plant leaves, tapeworms - worms, bacteria - all of them use the nutrients contained in the body of their "host" and live off it.

Viruses don't need this. They have nothing to eat and have no need: they do not have organs that carry out metabolism. However, they trust their "owner" with something much more - taking care of the continuation of their kind. The most intimate process of virus reproduction takes place in the interior of the cell. And the methods of penetration into the cell, this "holy of holies" of the organism, and the manner of action of the viral particles at all the following stages are extremely indicative.

These actions can be observed using the example of the bacteriophage T virus, whose "host" is Escherichia coli. The structure of this virus is peculiar. T2 consists of two parts - the head and the projection. The head is an icosahedron composed of protein structures. Inside the capsule is the carrier of the hereditary information of the phage-DNA. A hollow projection with six spines and the same number of fibril filaments at the end is attached to one of the faces of the icosahedron and is equipped with an outer "protector" of a special protein capable of contracting like a muscle. Here, at the tip of the process, there is a small amount of the enzyme lysozyme. The beginning of the convergence of the T2 virus with the bacterium-cell occurs as if by itself, under the influence of external forces: the phage is attracted to the surface of the cell like a magnetic mine "sticking" to the bottom of the ship.

However, the further actions of the virus are far from being so passive. Villi-fibrils and thorns allow it to strengthen in the most favorable position, to snuggle up to the cell membrane. In this case, the enzyme lysozyme, which is able to loosen cellular structures, begins to destroy the section of the membrane in front of it. This is followed by a sharp contraction of the "protector" and the process, piercing the thinned wall, is pushed into the cell. The DNA strand at this moment is, as it were, injected into the cell, and the shell that is no longer needed remains outside.

Viruses with a different structure enter the cell in a less intricate way. Attracted to the membrane of the cell and acting on it by enzymes, they provoke the retraction into the part of the membrane on which they have settled. A kind of vacuole capsule with a viral particle inside is formed. This vacuole then breaks off, and in it, traveling inside the cell, two processes continue to go on simultaneously - the viral particle with the help of its enzymes destroys the capsules enveloping it, and the cell enzymes destroy the outer shells of the virus, freeing it, as was the case with the T2 phage, nucleic acid.

Is the cell defenseless?

The formation of viruses begins, apparently, with the suppression of normal metabolic processes in cells. In particular, it was found that the ribonucleic acid (RNA) of the influenza virus is capable of synthesizing on cellular elements - ribosomes that are in charge of protein production. A special substance is also of a protein nature - histone, which, in turn, binds to the DNA of the cell and stops the synthesis of cellular RNA. Ultimately, cellular resources cease to be spent on the needs of the cells themselves and go to the disposal of the viral nucleic acid.

In other words, the cellular structures of a healthy organism, which are in charge of the reproduction of "spare parts" for the ever-renewing, rejuvenating cell, are ordered to manufacture parts of the viruses. These "semi-processed materials" accumulate in different parts of the cell, and then at the same intensive pace go to the assembly of new viruses. The shell of a depleted cell bursts, and the finally formed viruses are born.

The cell responds to the penetration of the virus with the

immediate production of a special protein substance - interferon. But interferon does not save an already affected cell, but prevents the viral infection from advancing to other cells in the body. In other words, behind the very first virions that break into the body, a barrier of interferon protection arises.

Later, usually in a few days, the "second echelon" of antiviral defense - antibodies - appears. These substances also of a protein nature neutralize the effect of viruses, prevent their reproduction.

Which of these natural protection means is the best? Both are good and needed. Interferon, which helps to ward off the first onslaught of a viral infection, disappears much faster, but if the need arises, it reappears just as quickly. It is his ability to act at the right time that explains the latent (hidden) nature of a number of viruses that coexist with our body. Example: the herpes virus, which is probably in the body of each of us, but can only appear at the moment of a cold, when the body is weakened and the production of interferon is lowered.

Antibodies that appear later last incomparably longer. It is they that become the basis of persistent immunity, thanks to which many infectious diseases do not recur twice in the life of one individual.

Medicine on the offensive

Among infectious diseases, 80% are viral. Plague, cholera, typhus, which once unconditionally dominated in medical statistical reports, with the advent of antibiotics and sulfonic drugs, forever lost their positions. They were replaced by diseases caused by viruses. But a successful struggle is being waged against these ailments. Poliomyelitis defeated. Smallpox is a painful memory. An offensive against measles is being launched on a broad front. Considerable efforts are directed at combating hepatitis, influenza, mumps, viral respiratory diseases. However, decisive achievements are yet to come.

Two main directions of the fight against viral infectious diseases can be noted - this is vaccination and the use of a natural substance "proposed" by nature - interferon. It is necessary to organize the broadest research on the planetary scale of the habitats of pathogenic viruses, the study of the conditions of existence, the identification of their permanent and intermediate "hosts" among mammals, insects and other living beings.

This is the tactic today. In the minds of the director of the Russian Institute of Virology named after D. Ivanovsky - Viktor Zhdanov, the strategy will depend on which hypothesis about the origin of viruses turns out to be correct. If the first two are true, then we are on the right track. If the hypothesis of "crazy genes" is confirmed, our plans will have to make significant adjustments. What kind? The future will show it.

The coronavirus, which got its name from the corona-like pins around the virus, works in a similar way. RNA with a genetic program is "written" into the protein envelope of the virus, forcing the host cell to work to produce new copies of the virus. At the same time, the analysis showed that the protein surface of the coronavirus differs from the proteins of related viruses. As the virus multiplies, copies of the virus break out of the initiated cell and invade neighboring cells.

Symptoms most often appear on the posterior larynx: a sore throat and a dry cough. Then the virus begins to gradually move down to the bronchi. When it reaches the lungs, it affects the alveoli - vesicle structures in which gas exchange between atmospheric air and blood occurs. As a result, edema and inflammation develops, the alveoli fill with fluid and dead cells, and viral-bacterial pneumonia (lung inflammation) progresses.

Viral particles are also capable of infecting the cells of the mucous membranes of many organs, primarily the gastrointestinal tract. Thus, in some patients, symptoms of infection do not appear in the form of cough and pneumonia, but in the form of diarrhea and abdominal pain. According to doctors, the virus can also infect the liver, heart, kidneys, bone marrow and blood vessels.

COVID-19 produces a much smaller immune response than almost anything previously known. Therefore, the incubation period, when a person does not yet feel the symptoms of the disease, but already infects others with a virus that has multiplied in his own body, is unusually long: two, and sometimes even more than three weeks (with ordinary flu - no longer than one week, and most often - a couple of days).

The main role in protecting a human is taken by his immune system, the main function of which is to preserve the genetic individuality of the organism both in relation to external factors (bacteria, viruses, etc.) and internal cell transformations, including due to acute and chronic stress. Louis Pasteur chose the term “immunity” for this. It comes from the latin word “immunitas”, which means - release. From the point of view of medicine, this is release from illness. According to experts, about 95% of the human body's defense against microbes is innate immunity. It not only detects the presence of microbes, but is able to recognize what type of microbes they appeared in the body, and accordingly direct the immune response.

Interferon puts the infected cell and others in the vicinity into defensive mode. It succeeds by turning on several genes, aptly named interferon-stimulated genes. These genes make proteins that help stop the spread of bacteria and other microbes, and are especially potent against viruses. Thus, they are able to prevent the virus from invading neighboring cells, not letting it into the cell nucleus.

The immune cells of older people are worse to recognize disease in the body. Older people have a large number of cells that can fight infections that have already happened, but at the same time there are fewer immune cells that are ready to resist new infections.

The number of immune cells in the blood usually peak in the evening and low in the morning. Reducing sleep time to less than five hours per night has been associated with an increased risk of colds and pneumonia.

Immunity is an amazing world, the whole Universe within the framework of the human body! Infinitely beautiful and amazing with its protective properties. Perfectly self-regulating under normal natural conditions, but becoming susceptible to infections under conditions of malnutrition and stress.

Fears for the lives of close ones, fears of economic shocks and the loss of their usual way of life - all of this has significantly changed people over the past few months. A depressed mood makes them more susceptible not only to the virus, but also to any other disease. And since any affliction weakens the body, then if a coronavirus infection is "superimposed" on it, the disease will be more severe. Meanwhile, a direct relationship between the psychoemotional state of a person and the activity of the immune system has been reliably established.

In nature, everything is interconnected. Many researchers believe that it is anthropogenic impact to the nature is responsible for the spread of diseases such as Ebola hemorrhagic fever, avian and swine flu, and now COVID-19. Humanity has invaded tropical forests and other ecosystems where many species of animals live in their natural environment, which are carriers of viruses unknown to us. Humans are destroying ecosystems and

shaking off viruses from their natural hosts. Then viruses need a new carrier. And it becomes a person.

Pathogens are transmitted from animals to humans. Three quarters of new human diseases originate from them. Pathogens do not respect species boundaries. Humans create conditions for the spread of disease by reducing natural barriers between themselves and animals in which the virus naturally circulates. COVID-19, which has lived in bats for a long time, has picked up "keys" to the cells of the human body as a result of another mutation. Scientists no longer doubt that the new SARS-CoV-2 coronavirus appeared naturally, that is, it came from nature, and was not created by hand at all.

In search of guilty

Experts agree that first SARS-CoV-2 appeared in bats (the sequence of its genes coincides by 96% with the genes of the virus isolated from the Rhinolophus affinis bat), then it was transmitted to pangolin (large lizards, similar to armadillos - genes match 99%). More detailed studies have shown that the coronavirus, which lives in the body of a pangolin, is able to enter human cells and infect it, while the bat coronavirus cannot. To jump over to humans, it needs an intermediate host.

In general, the family of coronaviruses has 40 species. Only seven of them can infect a human. The rest live in the bodies of other mammals and birds. But since the virus itself is a living organism, it evolves all the time and strives to jump into a new habitat. The SARS-CoV-2 coronavirus succeeded. Just as in 2002 its "cousin" - the SARS virus, passed on to humans from civets (predatory mammals of Asia and Africa).

Homo sapiens have lived next to animals for thousands of years: they breed some, hunt to others. It is not surprising that we also have common diseases. They are called zoonoses. Plague, anthrax, rabies, brucellosis, tularemia - there are more than a hundred such infections. Over 60% of all pathogens known to medicine have been picked up by humans from the birds and tailed animals around him, including domestic animals. Although in defense of indoor pets, it is worth saying that the vast majority of pathogenic microbes came from the wild fauna.

The main carriers of zoonoses are the same bats. It is as if nature intended them to act as incubators of all kinds of infections. The body of bats does not always produce immune cells, that is why it retains unique microbes that cannot be found in anyone else. Colonies in bats are gigantic, and they can move over great distances, sometimes thousands of kilometers. It was from these animals, as scientists found out, that people got one of the most deadly infections - Ebola hemorrhagic fever. Mortality reaches 90%.

Following bats in the list of dangerous carriers are primates and rodents. So, monkeys brought HIV and the Zika virus into the human population. But pets can also be a source of infection. 10 thousand years ago, our ancestors undertook to tame some biological species, from which they received the first zoonotic diseases. Measles and tuberculosis came to us from cows, whooping cough from pigs, and flu from ducks.

Bird and swine influenza viruses originate from the combination of human strains of the influenza virus with pathogens isolated from birds and pigs. In the recent past, they have also led to infectious outbreaks. And the infamous Spanish flu, which claimed 50 to 100 million lives a century ago, was caused by a virus of the same type as the 2009 swine flu.

As noted by the journalist of the weekly "Arguments and Facts" Dmitry Pisarenko, thanks to the achievements of medicine, the overwhelming number of diseases that the inhabitants of the wild have awarded us are now under control. Humanity has learned to fight back viruses and microbes by inventing vaccinations and other ways to protect against pathogens. But in 2020, it became obvious that we are not immune from new zoonotic ailments.

The pandemic will not go down for quite a long time. In addition, one must understand that the abolition of quarantine will not mean the end of the epidemic. So far, there is no clarity on how it will develop further, and this is largely due to the fact that we do not understand how the virus works. It can be much more infectious than previously thought. We also do not know what the virus does to the immune system, in general, to the human body.

It is clear that after the crisis will pass, the question arises: when and at what cost? At the end of the quarantine, having saved ourselves physically and psychologically, we will need to solve problems that will make great sense for a healthy person. This difficult period in the world takes a lot from people, but it also gives them the opportunity to reconsider their values, find pleasure in less, value their close ones, consume less and get along with what they already have.

In the current stressful situation, we began to compare the life of today and yesterday. Are all the latest acquisitions and amenities so necessary for complete happiness? Everything that seemed very important and prestigious yesterday (an expensive car, expensive huge real estate, expensive jewelry, beauty salons, branded clothing, Swiss watches, pompous meetings, events, etc.) were canceled under quarantine.

People are more interested in questions: will they be fired from their jobs, will there be enough places in hospitals in the event of an aggravation of the situation, will the medicines disappear, will the food prices rise? At such moments, the self-economy mode is activated, when citizens begin to abandon what can be postponed for later or do without them. Most of the population lives on wages. The standard of living of people determines the well-being in a particular country. Is it possible to name anything more meaningless than unemployment.

Pandemic Lessons

As the UN Secretary General Antonio Guterres noted, the coronavirus pandemic is a watershed moment for modern society. History will judge us not by how individual governments dealt with the crisis, but by how well we have been able to unite and coordinate efforts at the global level for the benefit of all of humanity. When we overcome this crisis, we will have a choice: to leave everything as it was before the pandemic, or to decisively eliminate the problems that have placed us in such a vulnerable position. Thus, humanity at full speed hit the brakes and was able to exhale, look around.

People forget that the earth, air and water are left to them, as it were, for a while, because other generations will follow, who will also feed on crops from this land, and everything should be left to them in a more attractive form. If nature dies, then man will also disappear from the face of the planet, and all the material achievements that we are so proud of will turn into debris that will be overgrown with weeds.

Today it must be admitted that the age of ecological arbitrariness, industrial expansion and uncontrolled population growth has practically brought the Earth to the brink of exhaustion. The high level of industrialization and urbanization of life leads to the depletion of natural resources and more and more destructive effects on nature, polluting and poisoning it with a variety of industrial and domestic waste. Now, when humanity is faced with acute environmental problems associated

with the destruction of many species of plants and animals, pollution of natural waters, soil and atmosphere, depletion of landscapes, desertification, depletion of mineral and water resources, destabilization of weather and climate, which led to a critical reduction in vital resources and a decrease in the area suitable for human habitation, will not the question of "climate" refugees also arise.

The situation in the world is such that the existing on Earth system of coordinates based on goods-money relations and oriented towards profit has reached a dead end, leading to the degradation or even self-destruction of civilization. The only habitat of Homo sapiens may be destroyed.

The World Wildlife Fund (WWF) notes that humanity does not allow our planet to restore the natural balance it has disturbed. People need to either reduce their needs and requirements for nature, or, having calculated the overall balance of their material and energy "exchange" with nature, consciously go to a more systematic regime in the use of natural resources that is consistent with the rhythms of recovery processes, and at the same time apply various measures that would provide an increase in the restorative forces of nature and a general increase in its resource potential.

The world will be saved by faith and optimism

Since the beginning of the pandemic, the role of social networks has grown exponentially, thanks to which people keep in touch with each other and receive reliable information. However, in addition to reliable information, outright lies are spreading on the Internet. According to a recent analysis of one of the largest social media platforms, 40% of posts related to COVID-19 were generated by bots - automated programs disguised as specific people.

The pandemic has shown that a disaster can appear out of nowhere, clearly demonstrating our vulnerability and unpreparedness. Land and sea, where live almost 8 billion people, expect intelligent deeds and accomplishments from people. Nature has already swallowed quite enough of toxic smoke and stale waters, it's time to turn to the fatherly home and build your house with the whole world in accordance with common sense.

It is clear that the pandemic will pass. Upon its completion, it will be necessary to solve the tasks that it revealed to us. The pandemic mercilessly showed the Earth planet with its blatant contrasts to the limit. Today's world is not only the world of cars, airplanes, automatic lines, digital technologies, radio telescopes that capture the pulsation of unimaginably distant galaxies. The most important thing is that the present world is the world of the human soul, so anxious, doubting and vulnerable, seeking truth, suffering from lies and injustice.

Now we are in turmoil, a great need for kindness has arisen. The mind should be well aware of what it is doing. Time has laid bare a gap, dangerous for the fate of civilization, between the technical power of man and the level of development of his social consciousness and morality. It is this gap that is one of the reasons for the nuclear threat hanging over the world, environmental, food and other global problems.

It is impossible to tell that humanity does not understand the impending threat over it. The earthlings finally came to understand the obvious fact: you need a habitat for live. People began to understand that the Earth is suffocating and is gradually dying under the weight of the offspring of human activity. This topic has long gone beyond the scope of discussion in political and scientific circles, it worries every inhabitant of the planet.

The COVID-19 pandemic has shown that there are no state borders for it, we live on the same planet. She made everyone equal, regardless of nationality and social level. A tragedy of this magnitude once again reminded us: we are one huge global family, in which there should be no distraction in the name of victory over a common misfortune.

What can save humanity from this virus? Only faith in the best and optimism. All over the world there should be uniform moral principles. Today it is important to understand that after the brutal blow of the coronavirus, life cannot be the same as before. Not only medical, financial and organizational lessons need to be learned from the current dramatic situation. Much needs to be rethought and felt. The rethinking must touch upon the foundations of the civil, political and moral life of mankind. It is necessary to get rid of everything false, false, superficial and, first of all, from an imperious behaviour towards native nature.

We need to overcome the feeling of hopelessness, which is generated by the contradictions of the crisis period. I would like to hope that each of us will gain health, starting with ourselves, which will help to find it to the native cradle - mother Earth. As noted by our great contemporary, poet and public person Olzhas Suleimenov, every person should be a defender of his native nature, the nature of the whole earth.