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Review Article

New Biological Theories as a Basis for Safe Receiving Genetically Modified Person

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Abstract

The work presents new biological theories that indicate the important role of viruses in nature. All 13 currently known viral theories, the classification of the genome into the main and acquired and nano-model theory of genome functioning are presented. A new scientifically based view of the understanding of the formation of higher nervous activity in humans is proposed, which is actually realized due to genetic modification of the organism. On the basis of new biological theories, the issue of the safety of genetically modified organisms is discussed. The prognosis for the development of people is given, taking into account the modern achievements of cell biology and neurogenetics.

Keywords: Genetic Modification; Virus Theory; Genetic Theory; The Main Genome; The Acquired Genome; The Person; Society

Introduction

The ethical issue of obtaining genetically modified people today is one of the most important issues of concern to progressive humanity. The thing is that a certain part of society with great concern and apprehension perceives the introduction of new technologies into the lives of millions of people. According to this position, modern genetic technologies can lead to the death of mankind or at least cause a huge number of mutants that are harmful to nature.

However, developed in 2018 – 2019 viral theories and genetic theory became the basis for an adequate and correct understanding of the mechanisms and technologies for producing genetically modified organisms. This made it possible to give a very optimistic forecast of human development. In fact, modern genetics and cell biology today can provide guarantees for the stable and safe development of mankind, if, of course, scientists adopt and begin to use in practice new biological theories that became the heritage of mankind in 2018 – 2019 (13 viral theories and one genetic) [17].

I propose to start a little familiar with the above biological theories [21,22]. All 13 currently known viral theories, genome classification and nano-model theory of genome functioning will be presented here. After that, on the basis of new biological theories we will discuss the issue of the safety of genetically modified organisms (humans). Imagine our forecast for the development of mankind, taking into account modern advances in cell biology and neuroscience.

Scientific meta analysis and viral theories

As a result of scientific meta-analysis, viral theories presented in Table 1 were created.

It is known that viruses are one of the biggest mysteries of modern biology. According to modern concepts, the virus (lat. Virus - poison) is a non-cellular infectious agent that can only be reproduced inside living cells. Viruses infect all types of organisms, from plants and animals to bacteria and archaea [1,11,14]. Viruses are found in almost every ecosystem on Earth, they are the most numerous biological form. Viruses are obligate parasites, as they are not able to multiply outside the cell [26].

1.	The Viral Theory of The Electromagnetic Reception
2.	The Viral Theory of Biocommunication
3.	The Viral Theory of Signal Transduction
4.	The Viral Theory of Functioning of The Energy System of Cell
5.	The Viral Theory of The Functioning of The Immune System
6.	The Viral Theory of Perception of Information
7.	The Viral Theory of Memory Formation
8.	The Viral Theory of The Functioning of The Somatic Nervous System
9.	The Viral Theory of The Functioning of The Autonomic Nervous System
10.	The Viral Theory of The Functioning of The Endocrine System
11.	The Viral Theory of The Functioning of The Cardiovascular System
12.	The Viral Theory of The Functioning of The Reproductive System
13.	The Viral Theory of Evolution of The Organic World and Homo Sapiens

Table 1: Viral theories.

However, given the current level of knowledge in various fields of science, there is an urgent need to revise some fundamental ideas about the true role and place of viruses in nature. For this purpose, a meta-analysis of various reliable scientific data was carried out, starting mostly since 1892 [22].

For the first time the existence of the virus was proved in 1892 by the Russian scientist D. Ivanovsky. After years of research into tobacco plant diseases, in a work dated 1892, D. Ivanovsky concluded that the mosaic disease of tobacco is caused by "bacteria passing through a bacteriological filter that, however, cannot grow on artificial substrates". On the basis of these data, criteria were determined according to which pathogens were assigned to this new group: filterability through "bacterial" filters, inability to grow on artificial media, reproduction of a picture of the disease with filtrate, freed from bacteria and fungi.

Five years later, when studying diseases of cattle – a similar filterable microorganism was isolated. And in 1898, during the reproduction of D. Ivanovsky's experiments by the Dutch botanist M. Beierink, he called such microorganisms "filtered viruses". In abbreviated form, this name came to denote this group of microorganisms.

In 1901, the first human viral disease was discovered - yellow fever. This discovery was made by the American military surgeon W. Reed and his colleagues.

In 1911, Francis Rouse proved the viral nature of cancer - Routh's sarcoma (only in 1966, he was awarded the Nobel Prize in Physiology and Medicine for this discovery).

If you understand the true place and functions of viruses in nature, then by their example it will be possible to study the fundamental foundations of life and its manifestations.

So, we have formulated 13 new viral theories, each of which reveals one of the functions of viruses in nature (Table 1).

Before proceeding to the description of these theories, we present some scientific data confirming the consistency of viral theories.

1. To date, approximately 5-6 thousand types of viruses have been identified and investigated, although they suggest that there are more than one hundred million of them. Why do you need such a huge biodiversity of these creatures? The answer to this question will be given in the description of our theories. Here we note only that Nature does not create anything for nothing.
2. Viruses differ in a special - disjunctive way of reproduction: the nucleic acids of viruses and their proteins are synthesized separately in the cell, then they are assembled into virus particles.
3. The genetic apparatus of viruses is very labile, they are able to mutate easily and thereby change their "behavior".
4. Viruses are widely distributed, capable of infecting almost all representatives of flora and fauna and even many microorganisms. Viruses have open access to one or many types of cells of various cellular life forms.
5. Per milliliter of ocean water accounts for 5×10^7 bacteriophages.
6. According to authoritative and reliable data, 1/3 of the human genome consists of so-called "junk genes". It is also known that this is the space where viruses are embedded.
7. The basic biological information necessary for building and maintaining an organism is the gene. It is a fact that

human genes contain 100 thousand DNA fragments of endogenous retroviruses, which constitute 5–8% of the human genome.

8. Viruses, their derivatives and closely related structures constitute at least 43% of the human genome [5].
9. According to the statements of the British researcher Dr. Frank Ryan, according to the latest scientific data, the human genome consists of a half of the DNA of viruses. "In fact, a person is a product of symbiosis, that is, relatively peaceful coexistence of the person himself and the virus," says Frank Ryan. - "If there wasn't them, there wouldn't be us. Or we would be completely different" [4,5].
10. It is known that even in a healthy organism numerous viruses reside without causing him much harm.
11. Thanks to the activity of viruses, the process of fertilization and the formation of the placenta in humans is successfully implemented, and in fact we owe our existence as a biological species to the functioning of viruses.
12. Why do children under a certain age have a poorly developed function of long-term memory? The fact is that only for 1–2 years of life a person forms the necessary arsenal of viruses, the viral composition giving the person the opportunity to carry out this unique opportunity to memorize and archive information for a long time. The viral composition is unique for each person and this can explain the individuality of each person's cognitive abilities [15].

Thus, we can conclude that viruses are migrating organelles of eukaryotic cells. They are in fact a part of us – cellular life forms and perform numerous functions. Viruses are not independent forms of life and this is evidenced by cellular theory. Three principles of cell theory are described below:

1. All living organisms are composed of one or many cells.
2. A cell is a structural and organizational unit in organisms.
3. Cells arise from pre-existing cells.

The first of these principles is disputed because non-cellular objects, such as viruses, are sometimes considered life forms.

However, according to our viral theories, cell theory is scientifically completely consistent. Next, we give our viral theories, which will confirm this conclusion.

In 1898, while reproducing D. Ivanovsky's experiments, the Dutch botanist M. Beyerink actually coined the term "virus", as he called such microorganisms "filtering viruses". Today, after about 120 years, relying on the foregoing, we suggest replacing the term "virus" with the term "biocommunicator", which certainly corresponds more to the functions they perform.

Each theory corresponds to a specific function of viruses (biocommunicators) in nature. Of course, every year the number of functions will grow.

The viral theory of the electromagnetic reception

Viruses functioning in the cells of living beings can act as electro-magnetoreceptors of electro-magnetic radiation (including ultraviolet spectrum). They are universal and very convenient intermediaries for converting one type of signal into another- the conversion of electromagnetic radiation into a sequence of nucleotides in their DNA or RNA molecules. As a result of the influence of electromagnetic radiation on viruses, they can easily be transformed and at the same time can easily be integrated into the genome of various cells, subordinating biochemical processes, and later physiological and behavioral characteristics of the whole organism. As a result of the influence of ultraviolet and other radiation spectra on the DNA and RNA of biocommunicators, they change their primary structure and/or spatial-structural organization (form), which actually contributes to the processes associated with the plasticity of the genome and therefore affect neuroplasticity. For details, see the nano-model theory of genome functioning presented below. Biocommunicators are crucial in the synthesis of various biologically active substances of natural origin (e.g., vitamins) in different organisms. After all, it is known that the biosynthesis of vitamins in plants or in the biosynthesis of vitamin D in the human skin has a major role ultraviolet radiation spectrum.

It is known that ultraviolet radiation reaching from the Sun to the biological systems of our planet is relatively safe and cause only genetic changes in the surface cells or viruses of the body. Further, these viruses (biocommunicators) migrate to the inside of the body, for example, in the Central nervous system causing there ultimately changes the biochemical and physiological processes. If necessary, the body's immune system can destroy these viruses. This mechanism provides a safe and gentle regulation of the behavior of all living systems of biocenosis from the Sun and Outer space, thus integrating all biological systems of the planet Earth into the Universe.

The viral theory of biocommunication

In biocenosis, the process of biocommunication, that is, the interaction between individuals of different species, in addition to the known channels of interaction is also due to the presence and functioning of numerous viruses (biocommunicators) of organisms and freely existing viruses that can easily transform and penetrate into the cells of another organism.

For the implementation of biocommunication in society a person is able to actively use viruses (biocommunicators) whose carrier it is. With the help of a virus, that can easily change its genetic apparatus of a person positively or negatively (depending on your thoughts) affects the surrounding people and other organisms of biocenosis transmitting these biocommunication them, all known transmission routes of viruses in nature. A similar process takes place between all organisms, all known in nature biological species. From prokaryotic life forms (e.g. bacteria) the role of biocommunicators plays plasmid. Plasmids are also known to science as mobile genetic elements.

The combination of all viruses, plasmids and other mobile genetic elements of the body is the material basis of his aura, as the totality of all Viroms, freely available mobile genetic elements and single-celled organisms in nature make up the General aura of our planet.

The viral theory of signal transduction

In the human body, animals, plants, fungi and microbial colonies a certain stage of signal transduction, that is, the signal transmission and the process by which one type of signal or stimulus is converted into another is also due to the presence and functioning of viruses (biocommunicators).

In multicellular organisms, viruses (biocommunicators) in addition to the nervous and endocrine systems provide the coordinated functioning of all its parts. Thanks to all this, a multicellular organism or a colony of bacteria is integrated into a single whole.

Viral theory of signal transduction can become the basis for understanding the mechanisms of formation of many human diseases and, consequently, for the development of new methods of their treatment. However, this will no longer be a symptomatic treatment, eliminating mainly the consequences of the disease, and the therapy will be aimed at eliminating the main causes of the formation of the disease. This viral theory will certainly shed light on the understanding of the mechanisms of formation of cancer [16], neurodegenerative and many other diseases [18].

The viral theory of functioning of the energy system of cell

According to one theory of the origin of mitochondria and plastids as cell organelles, they originated from free living prokaryotic cells. At a certain stage of the evolution of the organic world of mitochondria and plastids entered into symbiosis with eukaryotic cells, performing in them the most important functions associated with the energy system of the cell. Mitochondria synthesize ATP as a result of aerobic splitting of organic compounds, and plastids (chloroplasts) carry out the process of photosynthesis.

According to other scientific data, bacterial (prokaryotic) cells often have specific viruses- bacteriophages. They regulate the activity of bacteria. Mitochondria and plastids are no exception. Based on the above scientific data, we can formulate another viral theory, which is associated with the functioning of the energy system of the cell. Eukaryotic cells regulate the activities of its organelles (mitochondria and plastids) with the help of their other organelles – biocommunicators (viruses). This is one of the clearest examples of the signal transduction function of viruses. Thus, the energy system of the cell (mitochondria and plastids) is fully integrated into the organism.

The second most important example of the regulation of energy processes in the cell is the process of photosynthesis in cyanobacteria. As is known, thanks to the activity of viruses, an ordinary bacterium becomes a full-fledged cyanobacterium capable of carrying out the process of photosynthesis.

Based on the above, we can conclude that viruses are actively involved in the energy processes of prokaryotic and eukaryotic cells. The viral theory of the functioning of the energy system of the cell is really the basis for understanding the mechanisms of formation of many diseases in humans [18], including cancer and neurodegenerative [16].

The viral theory of the functioning of the immune system

Viruses of humans, animals, plants and other organisms play a role in the functioning of the immune system. It is known that humans and animals have intestinal microflora, skin and other organs, consisting of a huge number of microorganisms in the cells of which bacteriophages function. They are the migrating organelles of cells of a multicellular organism and normally should regulate

the number and behavior of these microorganisms. And the microflora itself plays the role of "defender" of the body from pathogenic microbes. Thus, viruses are one of the most important components of the body's immune system.

In addition, it is known that fragments of the genetic material of viruses fixed in human DNA, eventually turned into key elements of the immune system. Similar processes occur in other species.

The viral theory of perception of information

Viruses of humans, animals and other organisms play a leading role in the process of information perception. The information we receive from the senses (receptors) is transmitted to the Central nervous system, where it is presented in the form of electrical impulses. And the process of electrical activity in the Central nervous system leads to the formation of a certain sequence of nucleotides of DNA/RNA-containing viruses (biocommunicators), and also changes their configuration (3D) and motor activity (4D). An important role in this process is played by microtubules of cells that form the same antenna on the cell surface. Microtubules are transport infrastructure for DNA - and RNA-containing biocommunicators (viruses). Thus, in neurons and, consequently, in the brain, biological nano-models of various objects "noticed" by receptors of the organism are created. In humans, there is also the opportunity for creative thinking. Each thought can correspond to one particular "virus", and the emotion is already a whole group of "viruses". Often the brain can penetrate even a "virus" or a group from outside (the thought or emotion of another organism) and thus to carry out biocommunicator. This can confirm the well-known fact that viruses are able to control the consciousness of different species of animals and humans. This in turn creates the prerequisites for the formation of long-term memory.

Because the perceptual process usually begins with a receptor, it is important to note that the functional activity of individual receptor also depends on the activities of biocommunicators.

The viral theory of memory formation

A process of continuous electrical activity in the Central nervous system in the course of reverberation leads to the formation of structural changes of DNA/ RNA-containing viruses (biocommunicators) virom's of humans and animals. All these changes in neural responses is called theconsolidation, and viruses (biocommunicators) are the material carriers of information in long term memory. In fact, there is the formation and further storage of biological nano-models. Further, the expression of these genes leads to the extraction of information from long-term memory. In the human body, the function of a carrier of information in short-term and long-term memory is performed by herpesviruses.

Herpesviruses [27] (lat. Herpesviridae) – a large family of DNA-containing viruses, which infected the majority of the population of our planet [3].

As of May 2016, the International Committee on Taxonomy of Viruses (ICTV) has registered 86 species of viruses on the website of International Committee on Taxonomy of Viruses (ICTV)]. A distinctive feature of this family of viruses is the presence of the virus in the cells latent, persistent, infinitely long time, without clinical manifestations. Therefore, according to our theories, at this time they perform the most important functions of the higher nervous activity of the organism described by us.

In fact, memory is not localized in certain parts of the brain, and distributed throughout the body. The key role and place of storage of memory of course plays the body's brain. Brain structure responsible for memory formation in DNA (and perhaps RNA) biocommunicators and implementation processes the information contained in these molecules of memory.

The viral theory of the functioning of the somatic nervous system

Viruses of the human body and animals play a leading role in the process of transforming the will and intentions of the body into movements. All the acquired skills of the body during life are postponed in the form of changes in the structural and spatial organization of the genetic material of biocommunicators in the long-term memory of humans or animals and further, if necessary, the expression of these genes. It is thanks to the above molecular mechanisms that the body has the opportunity to carry out motor and speech activity and actually subordinate the functioning of the somatic nervous system to its will. In fact, this can explain the formation of linguistic abilities in humans. And thus, the genes responsible for it must be sought in the acquired genome (genes biocommunication). For more information, see our nano-model theory of genome functioning presented below.

The viral theory of the functioning of the autonomic nervous system

Viruses of the human body and animals also play a leading role in the functioning of the Autonomous nervous system. Many innate and acquired skills of the body during life are presented in the form of changes in the structural and spatial organization of the genetic material of biocommunicators in the genetic/long-term memory of the body and in the future, if necessary, the expression of these genes. Thus, the autonomic (vegetative) functions of the nervous system of humans and animals, which are vital for the body, are provided. It is thanks to the above molecular mechanisms that the body has the opportunity to better adapt to changing environmental conditions. However, it should be borne in mind that the genes of the main genome also carry a significant burden in ensuring the functioning of the Autonomous nervous system.

The viral theory of the functioning of the endocrine system

The endocrine system of the body along with the nervous system is one of the most important regulatory systems. The integration of parts of the body into a single whole and the regulation of life is provided largely on the basis of the conditions of existence of the system (organism), and is implemented through the production and functional activity of hormones. Biologically active compounds (hormones) are actually copies of the gene biocommunicators endocrine system and in fact implementing biological information encoded in the corresponding gene (according to the principle of nano-prototyping a theory of the functioning of the genome). All this is possible only thanks to the most important genetic features of the genome of the organism - its plasticity (see details below). Changes in the conditions of existence affect changes in the structural and spatial configuration of DNA/ RNA viruses and this is due to the regulatory basis of the functioning of the hypophysis (the main gland of internal secretion of humans and some animals). And then the hypophysis regulates the activity of other organs of the endocrine system and, consequently, the entire body. This principle/mechanism also works for the functioning of the nervous, immune, cardiovascular and other systems of the organism.

The viral theory of the functioning of the cardiovascular system

The cardiovascular system of the body is a vital and integrative system, so given the importance of the autonomy of the heart. Regardless of the activity of the neuro-endocrine-immune system biocommunicators (viruses) of the heart can have a significant impact on the activity of the heart muscle, thereby affecting the body as a whole. According to our theory, the heart of the body is no less important in making important decisions for the body than the brain. In fact, biocommunication heart is able to provide short - and long-term memory of the body. For many of the features of the emotional sphere of the human body is responsible to the heart is with the so-called cardio biocommunication.

The viral theory of the functioning of the reproductive system

To date, it has been fully proved that thanks to the activities of viruses (biocommunicators), the process of fertilization and the formation of the placenta in humans is successfully implemented. It turns out that we owe our existence as a species to the functioning of these Creatures. In addition, viruses take an active part in the communication process, which is a key factor for the functioning of the reproductive system in humans and animals (as well as other species). This applies, for example, sexual attraction between individuals of different sexes and all subsequent stages (insemination and fertilization) to ensure the process of reproduction.

The viral theory of evolution of the organic world and homo sapiens

It is thanks to viruses from prokaryotic cells formed eukaryotic cell. At this stage of evolution, viruses (biocommunicators) perform the function of mobile genetic elements, play a major role in the horizontal transfer of genes in nature and thus are the main component of the acquired genome. Under the influence of the external and internal environment of DNA/RNA biocommunicators easily mutate or at least change the spatial-structural organization and, therefore, carry out the role of the driving force of the evolutionary process of the organic world. Thus, thanks to its ability to plasticity of the genome, the organism can perfectly adapt to changing living conditions. Thanks to the activity of biocommunicators in the process of evolution of the organic world, a new biological species has appeared - Homo sapiens. Viruses (biocommunicators) became the basis for the formation of higher human nervous activity.If the biocommunicator makes changes (is inserted) into the main genome of the stem germ cell, it becomes an endovirus and is passed on from generation to generation.

Modern classification of genome: the main and acquired genome

Genome – a set of hereditary material contained in the cell of the body. The genome contains the biological information needed to build and maintain the body. Most genomes, including the human genome and the genomes of all other cellular life forms, are built from DNA. There is also another definition of the term "genome", in which the genome is understood as a set of genetic material haploid set of chromosomes of this species [7,28].

According to the classical data in humans (Homo sapiens) hereditary somatic cell material is represented by 23 pairs of chromosomes (22 pairs of autosomes and a pair of sex chromosomes), located in the nucleus, and the cell has many copies of mitochondrial DNA. 22 autosomes, sex chromosomes X and Y, human mitochondrial DNA contain together approximately 3.1 billion base pairs.

In many species, only a small fraction of the total genome sequence encodes proteins [25]. Thus, only about 1.5% of the human genome consists of protein-coding exons (DNA sites, copies of which are Mature RNA). The reasons for the presence of such a large number of non-coding DNA in eukaryotic genomes and the huge difference in sizes of the genomes (P-value) is one of the unsolved scientific mysteries; the research in this area also point to a large number of relict fragments of virus in this part of the DNA.

Reading the sequence of letters in the human genome does not yet give an understanding of how the genome works. This is not a decoding of the genome, but, on the contrary, an encrypted text, the meaning of which we do not yet understand. According to modern classical ideas the main intrigue is that all cells of the body have the same DNA, which contains information about the coding of certain proteins. But different tissue cells are different, muscle cells are not like nerve cells or blood cells. In the process of development, each organism goes from a fertilized egg to an adult and changes all the time, but the genome does not. Obviously, the work of genes varies in different places and at different times. The way it is regulated is the "basic mystery of life".

Below is our scientific position, according to which fully explains "the main the puzzle life". This was made possible by understanding such a basic biological process as the formation and functioning of the acquired genome in the process of ontogenesis. In other words, in nature, there's the plasticity of the genome [21]. Let's begin.

The main genome is a set of all genes obtained by the body from the egg and sperm as a result of fertilization (nuclear, mitochondrial, plastid). It is vertical transfer of genes [21].

Acquired genome is the set of all genes produced by the body during embryonic and post-embryonic periods by migratory organelles cells (biocommunicators) in the form of molecules of DNA and RNA. It is important to note that the acquired genome can also be formed on the basis of existing genes (biocommunicators) under the influence of, for example, electrical processes occurring in the nervous system of the body (see viral theories of information perception, memory formation and functioning of the nervous system) [22] which take place as a result of the activity of sensory systems of the body. The formation of the acquired genome is also influenced by electromagnetic radiation (for example, ultraviolet radiation spectrum) of natural and artificial origin. In fact, it turns out that all changes occurring in the external and internal environment of the body are fixed (cause changes) in the acquired genome. Those that are important-are stored in the reserves of long-term memory of the body. This is horizontal gene transfer [21]. The acquired genome is individual for each somatic cell. If the process takes place in the gametes that can be formed endo-viruses genes that are already known to be inherited from generation to generation.

The role of biocommunicators single-celled prokaryotic organisms (e.g. bacteria) plays plasmid. However, they are not able to perform all the functions inherent biocommunication. Below we draw your attention to the fact that plasmids carry out active horizontal gene transfer in prokaryotes. Analogues of plasmids for the eukaryotic viruses are. Bacteriophages (bacteria viruses) are not bio-communicators (migrating organelles) of bacterial cells and this is indicated by the fact that they forcibly introduce their genetic material into the bacterial cell. Thus, bacteriophages are biocommunication of various eukaryotic cells (they are migratory organelles) to implement and enforce the regulation of various biochemical processes in bacterial cells, and their numbers (on the part of the owner of this biocommunicators).

Plasmids and their role in horizontal gene transfer in bacteria

Plasmid – small DNA molecule that is physically separate from the chromosomes of the genome and is able to replicate autonomously. As a rule, plasmids are found in bacteria and are double-stranded ring molecules, but occasionally plasmids are also found in archaea and eukaryotes [6,10].

In nature, plasmids usually contain genes that increase the resistance of bacteria to adverse external factors (including resistance to antibiotics), often they can be transmitted from one bacterium to another (sometimes even to another species of bacteria) and thus serve as a means of horizontal gene transfer.

Getting plasmids in the cell can be carried out in two ways: either by direct contact of the host cell with another cell in the process of conjugation, or by transformation, that is, artificial introduction of plasmids into the cell, which is preceded by a change in the expression of a certain gene of the host cell (the acquisition of competence of the cell).

In fact, plasmids serve as biocommunicators in prokaryotes. The fact that plasmids are involved in active horizontal gene transfer in prokaryotic organisms indicates that a similar process should certainly take place in eukaryotic life forms. It is known that prokaryotes from the evolutionary point of view are older and more primitive than eukaryotes, therefore, in the process of evolution (the emergence of eukaryotes from prokaryotes) to lose the ability to horizontal gene transfer from the eukaryotes would be simply unforgivable. Yes, it is unforgivable by Nature. New eukaryotic forms of life simply could not survive the struggle for existence and would be eliminated by natural selection. After all, no competent specialist- scientist in this field has any doubt that the exchange of genes (determining signs and properties) in the process of ontogenesis of the organism gives him only advantages. Thus the cell (organism) becomes more adapted to new and constantly changing conditions of the environment. Remember only the ability of bacteria to become resistant to antibiotics through horizontal gene transfer, which certainly makes them "stronger" and less vulnerable. In other words, plasmids (biocommunicators of prokaryotic cells) bacteria provide enormous benefits. In addition, as you know, eukaryotic organisms still survive and even thrive. Moreover, multicellular eukaryotic life forms at this stage ofthe evolution of the organic world are the leaders of Biocenosis. For this reason declare with all responsibility that the role of plasmids from eukaryotic organisms certainly perform viruses (biocommunicators), which actually have a more complex structure compared to plasmids and therefore perform more functions (see viral theory; it is 13 known to date functions biocommunicators from eukaryotic forms of life).

According to the above information about the acquired and core genome, it is possible to give a new definition to the term "phenotype". Phenotype is a manifestation of a set of genes obtained by vertical and horizontal channels of gene transfer and the result of their interaction. Therefore, the phenotype is the expression (manifestation) of the genotype. Naturally, the contribution is made by combinative and mutational variability.

The body throughout life – from the moment of fertilization of the egg (the formation of the zygote) to death has the ability to enrich its genotype by increasing the proportion of the acquired genome. This is done by horizontal gene transfer. Information received by sensory systems (receptors) of the body about the external and internal environment actively affects the change (enrichment or impoverishment) of the acquired genome of the organism, as a result, the phenotype changes. However, these changes affect only the genes of certain cells of certain tissues of the body. For example, cells of the Central nervous system (CNS) of humans or animals, immune system or liver cells change. If the changes affect the germ cells, the new features and properties will be inherited from generation to generation. Thus, there is a genetic modification of various organisms (including humans).

According to the additional position of the cell theory, the cells of multicellular organisms (e.g., zygote) totipotently, that is, have genetic potentials of all cells of the organism, are equivalent in genetic information, but differ from each other by different expression (work) of different genes, which leads to morphological and functional diversity – to differentiation.

The opinion of the author of this scientific article is radically different from the above additional position of the cell theory. Bearing in mind that there is an acquired genome (except the main one)- cells in the process of ontogenesis of the organism already become not equivalent in genetic information and therefore differ from each other not only by different expression of different genes, but also by different gene set of the acquired genome. This is essential for morphological and functional diversity (differentiation) of cells. It is a necessary condition for the appearance of highly specialized cells of multicellular organisms (in humans, for example, in the process of perinatal and post-notal periods of ontogenesis). This feature is not taken into account by many bio-engineers in obtaining tissues and organs *in vitro* for their further use for medical purposes (transplantation of tissues and organs) and therefore can not get fully functioning and suitable for transplantation to the recipient many types of human tissues and organs. To date, more than one scientist in the world could not get the human brain *in*

vitro, and never will, if you do not take into account the presence of the acquired genome of the cell, because in the complex functioning organs (e.g., brain) plays a key role is horizontal gene transfer.

Thus, taking into account our classification of the genome at the basic and acquired levels, it is possible to achieve a full understanding of the various biological processes occurring at the genetic, cellular (biochemistry) and organizational (physiology) levels of the organization, in normal and in various pathologies. Not to mention the great prospects for bio-engineers [21].

Brain plasticity and the plasticity of the genome

According to the above, the genome of the organism is an actively and dynamically developing system throughout the entire period of ontogenesis, but in order to make this thesis more convincing, we give below the analogy with plasticity of the human brain.

Neuroplasticity is a property of the human brain, consisting in the ability to change under the influence of experience, and also to restore lost connections after injury or as a response to external influences. This property is described relatively recently. It was previously generally accepted that the structure of the brain remains unchanged after it is formed in childhood [13,24].

The discovery of the fact that thoughts are capable of changing the structure and functions of the brain, even in old age, is the most important achievement in the field of neuroscience over the past four centuries. Norman D offers a revolutionary view of the human brain [12].

The brain consists of interconnected nerve cells (neurons) and glial cells. The process of learning can occur through changes in the strength of connections between neurons, the emergence or destruction of connections, as well as the process of neurogenesis. Neuroplasticity refers to the processes of bond formation/destruction and neurogenesis [13,24].

During the 20th century, it was generally accepted that the structure of the brain stem and neocortex remained unchanged after the formation was completed in childhood. This meant that learning processes there can only go through changes in bond strength, while areas responsible for memory processes (hippocampus and dentate gyrus) and retaining the ability to neurogenesis throughout life are highly plastic. This opinion changes under the influence of new research results, which state that the brain retains its plasticity even after the childhood period.

Neuroplasticity can manifest itself at different levels, starting from cellular changes in the brain, up to large-scale changes with reassignment of roles in the cerebral cortex, as a response to damage to specific departments. The role of neuroplasticity is widely recognized by modern medicine, and also as a phenomenon used in the development of memory, training, and restoration of the damaged brain.

The idea of "plasticity" of the brain was first proposed by William James in 1890, but it was not given any importance for the next fifty years. The term “neuroplasticity” was first introduced by the Polish neurophysiologist Jerzy Konorski.

One of the fundamental principles of neuroplasticity is the phenomenon of synaptic pruning: the brain is constantly undergoing the process of destruction and the creation of connections between neurons. Recall that synaptic pruning is a reduction in the number of synapses or neurons to increase the efficiency of the neural network and remove redundant connections. Pruning includes both pruning of the axon and dendrites.

Thus, scientists are a little late, but still came to the conclusion about the existence of neuroplasticity in nature. Why not accept the fact of the plasticity of the genome (the processes of the emergence/destruction of genes in the process of ontogenesis of the organism) and with the help of this understanding of the underlying biological processes explain the numerous processes occurring in nature and which are the "mysteries" of science. I propose to geneticists not to make “mistakes” of neuroscientists and timely review and decide on the question of the plasticity of the organism’s genome, which will certainly have a huge impact on the development of the biological sciences and numerous practical areas of knowledge.

The nano-model theory of genome functioning

According to our nano-model theory of the functioning of the genome, the DNA molecule stores biological information not only in the form of a genetic code consisting of a sequence of nucleotides, but also in the form of a spatial-structural organization. This means that the information component lies not only in the primary structure of the organization of DNA molecules, but also in structures II and III. These are actually peculiar biological nano-models [21].

RNA molecules can carry out a similar function in nature, as well as, to some extent, protein molecules.

DNA contains information about the structure of various types of RNA and proteins [2]. But this does not mean that the DNA molecule does not have the ability to independently carry out numerous biological functions that ensure the vital functions of living systems.

Almost all genes function on the principle of nano-layouts. However, based on the fact that many genes of the main genome are localized in the cell nucleus, but must function in the cytoplasm or outside the cell, therefore nature has created the processes of transcription and translation known to modern biology. Protein has a three-dimensional structure (definite form) due to its II, III, sometimes also IV structure. It is known, for example, that a protein-enzyme has an active center that functions according to the principle of a key to a lock. Depending on its form, it will have a certain functional activity. A DNA molecule (its specific region is a gene) also has a II and III structure, that is, it is not just a linear molecule consisting of nucleotides [2,9].

The whole point of the transcription and translation processes is to create a copy of the nano-model (DNA gene) in the form of ribosomal RNA (r-RNA), transport RNA (t-RNA) or messenger RNA (m-PMK). In the case of m-RNA, the process of biosynthesis of the polypeptide chain (the primary structure of the protein) follows — translation on polyribosomes in the cytoplasm of the cell. In fact, ready-made copies of DNA nano-layouts capable of functioning outside the cell nucleus of the eukaryotic cell are provided. Protein biosynthesis is carried out as is known on the basis of m-RNA information; rRNAs are part of the ribosomes that are actively involved in the biosynthesis of proteins (primary structure); and tRNAs are necessary for the delivery of amino acids to the site of protein synthesis. Many genes consist of exons — coding regions and introns — noncoding regions. During transcription, the gene reads RNA carrying both exons and introns. In the process of splicing, introns are excised, and the exons are mated to form mature m-RNA. Further, the polypeptide chain of a protein synthesized in the process of translation will acquire a spatial-structural organization and become a fully functional product (protein).

Thus, here we presented in a simplified form the process of forming copies of nano-models based on biological information embedded in the DNA of genes.

And part of the genes (mostly “junk genes” and part of the genes of the acquired genome) do not need such intermediary processes, therefore, there is no need for the implementation of transcription and translation processes. Because these genes must function either in the place of their localization (regulatory genes, for example), or they have the ability to exit from the cell nucleus and cell. This applies to biocommunicators (DNA and RNA containing). They for effective functioning and transportation become covered by a proteinaceous cover - capsid. Along with biocommunicators, there are transposons. Transposons are parts of the DNA of organisms capable of movement (transposition) and reproduction within the genome. Transposons are also known as “jumping genes” and are examples of mobile genetic elements.

That is why the vast majority of the human genome is a non-coding protein.

This is essentially the "gene language".

Below, using the example of the spatial-structural organization of RNA molecules, which clearly shows the importance of their three-dimensional (3 D) organization for performing biological functions, we will show the viability of the nano-model theory of the functioning of the genome also in the case of DNA molecules.

The secondary structure of RNA is determined by a sequence of nucleotides (primary structure), which in turn determines the tertiary structure of loops consisting of unpaired bases and open chain segments, which are kept in a fixed state relative to each other. Such naked areas are potential points by which t-RNA can specifically interact with other nucleic acids (for example, the interaction of t-RNA with r-RNA or m-RNA) and contain new possibilities used in coding or transferring information in living systems that are not characteristic of destructured single-chain strands or perfect double helix. The same is true for the three-dimensional structure (3D) of DNA molecules. Like t-RNA, its function depends largely on the three-dimensional structure.

Scientists have discovered an unusual form of DNA in human cells. Its form is not classic, but in the form of a node. Now it became known that the previously open spiral (more precisely, in the form of a double screw) DNA structure is not the only one in our body. Previously, this type of DNA could only be created artificially. The structure in its structure resembles a knot of four threads, which are connected very intricately. In addition, the nodular structure of DNA is able to form and disintegrate over the course of a person’s life.

It is important to discuss the issues of epigenetics, which have become an excellent confirmation of our genetic theory. The most

commonly used definition of epigenetics was introduced by A. Riggs in the 1990s and is formulated as "a study of mitotically and/or meiotically inherited changes in the function of genes that cannot be explained by changes in the DNA sequence".

The molecular basis of epigenetics is quite complex, despite the fact that it does not affect the primary structure of DNA, but changes the activity of certain genes. This explains why only the genes necessary for their specific activity are expressed in the differentiated cells of a multicellular organism. A feature of epigenetic changes is that they are preserved during cell division. It is known that most epigenetic changes are manifested only within the life of a single organism. At the same time, if a change in DNA occurs in a sperm cell or egg, some epigenetic manifestations can be transmitted from one generation to another.

Our nano-model theory of the functioning of the genome perfectly reflects the numerous processes occurring both at the cellular and at the organism level. Genes functioning on the principle of nano-layouts are in fact a kind of copy of the macrocosm. Depending on the adequacy of the reflection of the macrocosm at the cellular level, it is possible to judge the level of quality of information perception from the organism. The well-known expression: "The brain is in the World, and the World is in the Brain", becomes fully explicable thanks to the above scientific data.

Genetic code. Properties of the genetic code

The genetic code is a unified system for recording hereditary information in nucleic acid molecules as a sequence of nucleotides. The genetic code is based on the use of an alphabet consisting of only four letters A, T, C, G, corresponding to DNA nucleotides [9].

Since there are 20 different amino acids in proteins, each cannot be encoded by one or two nucleotides (only 42 = 16 amino acids will be encoded). The shortest possible word length, which determines the amino acid, consists of three nucleotides (the number of possible triplets is 43 = 64). Of the 64 codons, three - UAA, UAG, UGA – do not encode amino acids, they were called nonsense codons. Later it was shown that they are termination codons (TC) (table 2).

Table 2: Genetic Code Table.

Characteristics of the genetic code

- **Triplet nature:** A triplet code could make a genetic code for 64 different combinations (4 X 4 X 4) genetic code and provide plenty of information in the DNA molecule to specify the placement of all 20 amino acids. When experiments were performed to crack the genetic code it was found to be a code that was triplet. These three letter codes of nucleotides (AUG, AAA, etc.) are called codons.
- **Degeneracy:** The code is degenerate which means that the same amino acid is coded by more than one base triplet. For example, the three amino acids arginine, alanine and leucine each have six synonymous codons.
- **Nonoverlapping:** The genetic code is nonoverlapping, i.e.,the adjacent codons do not overlap. A nonoverlapping code means that the same letter is not used for two different codons. In other words, no single base can take part in the formation of more than one codon.
- **Commaless:** There is no signal to indicate the end of one codon and the beginning of the next. The genetic code is commaless (or comma-free).
- Non-ambiguity: A particular codon will always code for the same amino acid. While the same amino acid can be coded by more than one codon (the code is degenerate),

the same codon shall not code for two or more different amino acids (non-ambiguous).

- Universality: Although the code is based on work conducted on the bacterium Escherichia coli but it is valid for other organisms. This important characteristic of the genetic code is called its universality. It means that the same sequences of 3 bases encode the same amino acids in all life forms from simple microorganisms to complex, multicelled organisms such as human beings.
- Polarity: The genetic code has polarity, that is, the code is always read in a fixed direction, i.e., in the 5′ → 3′ direction.
- Chain Initiation Codons: The triplets AUG and GUG play double roles in E. coli. When they occur in between the two ends of a cistron (intermediate position), they code for the amino acids methionine and valine, respectively in an intermediate position in the protein molecule.
- Chain Termination Codons: The 3 triplets UAA, UAG, UGA do not code for any amino acid. They were originally described as non-sense codons, as against the remaining 61 codons, which are termed as sense codons.

The functioning of protein-coding genes in the light of the modern genetic theory of the functioning of the genome

It is known that in the human genome only a small part of the genes (according to some data, 1.5%) are protein-coding. But even the functional activity of these genes cannot be logically and scientifically justified within the framework of only the concept of the genetic code.

For protein biosynthesis, the following processes are necessary:

- Transcription – the process of RNA synthesis using DNA as a matrix, which occurs in all living cells. In other words, it is the transfer of genetic information from DNA to RNA.
- Formation of mature m-RNA.
- Translation – the process of protein synthesis from amino acids on a matrix of informational (matrix) RNA (m-RNA, m-RNA), carried out by a ribosome.

At the stage of formation of mature m-RNA, the principles of the nano-model theory of the functioning of the genome act.

In addition, polyribosomes synthesize a protein that is not ready in functional terms (with a secondary, tertiary or even quaternary structure), but only its primary structure (polypeptide chain consisting of the corresponding amino acid residues). Already only after leaving the EPR, in the Golgi Cell apparatus, ready-made and fully functional proteins are produced. This process also takes place due to the nano-model organization of the genome.

Thus, we can conclude that the information about a protein is completely not laid down in the gene responsible for its synthesis, moreover, m-RNA also does not carry all the information. Part of the decisions on the biological activity of the produced protein can carry the r-RNA that is part of the protein synthesizing ribosomes. In fact, the genes responsible for the synthesis of r-RNA in the cell nucleus (in eukaryotic cells) are essentially certain regulatory genes in the production of a protein, and the protein of the synthesizing gene carries "raw" information about the sequence of amino acid residues in the produced protein.

According to our viral theories, the formation processes of already functionally active proteins (4D, the bulk macromolecule in motion) is controlled by biocommunicators, which were contained in large numbers in the Golgi Apparatus.

Differentiation of cells in multicellular organisms: the formation of higher nervous activity in humans

If we take into account that the organism (cell) has the main and acquired genome, then this fact sheds light on many, currently, unresolved scientific issues, and primarily on aspects of the genetic level of the organism's development. In turn, it becomes clear how and by what molecular mechanisms the differentiation of cells in multicellular organisms takes place in the process of individual development (ontogenesis). For example, the emergence of highly specialized functions in the neurons of the human brain and the manifestation of various functions of higher nervous activity already on the organism level, many of which are considered to be "secrets" of science even at the present stage of human development, are fully scientifically justified.

Therefore, it is not surprising that genetics who study the human genome are struggling to find the genetic features that led to an increase in the brain and, possibly, its more efficient work. Special hopes are placed on comparing the human genome with the chimpanzee genome. This allows us to immediately exclude from consideration those 98% of the genome that are identical in our species. Somewhere in the remaining two percent, the secret of human uniqueness is encrypted. It remains to understand exactly where and how.

Immediately after reading the genome of the chimpanzee genetics, friendly ranks rushed to storm the "eternal secret" of human uniqueness. Publications dedicated to identifying the unique genetic features of Homo sapiens are becoming more frequent, and it seems that a little more – and something very important will be revealed to us. And in fact, today, the biological theories proposed by us are capable of explaining all this in a scientifically sound manner.

Human behavior and mental abilities are at a qualitatively new level compared to monkey. It is reasonable to assume that these differences are of a genetic nature.

As a result of serious research, scientists have proved that the origin of man did not show a universal and large-scale accumulation of amino acid changes in the genes involved in nervous tissue [8,23].

But we are still smarter than chimpanzees, and our relative brain size is bigger! "Apparently, the development of our mental abilities is encoded by a very small number of genes (a change in their sequence or level of expression), and these changes do not affect the average characteristics for all genes of the nervous system" [8,23]. These researchers arrived at similar conclusions.

And according to our proposed classification of the genome on the main and acquired (based on our viral theories) and the nano-model theory of the functioning of the genome, all this can be explained very logically and scientifically grounded. The fact is that modern classical genetics study only the main genome of the body, that is, the genes obtained from the parent germ cells (egg cell and sperm cell). However, for the functioning of highly specialized cells (such as neurons of the brain, for example) - those genes that were obtained from parents by vertical transmission (from germ cells as a result of zygote formation) will not be enough. According to our viral theories, for the full perception of information, the formation of long-term memory and the functioning of the somatic nervous system, the organism must additionally receive a certain set of genes through horizontal gene transfer. This normally occurs in the perinatal and postnatal periods of the individual development of the organism. In order for most of the highly specialized cells in the human body (or another multicellular organism) to begin to fully perform the functions they have designated, it is not enough just to "turn on" (express) certain groups of genes and turn off other groups of genes of the main genome. If everything were so simple, then geneticists would have long since found many genes from the main human genome, which are unique to us (the people) and distinguish us, for example, from monkeys. There is no doubt that the man is quite superior to other types of animals in his development. And these differences are due precisely to obtaining additional genes already in the process of human ontogenesis. The basic human genome only creates the prerequisites (favorable conditions) for the realization of this most important process and for this only a small number of genes are needed. By the way, according to modern genetic studies, this is what distinguishes us, for example, from chimpanzees in the main genome.

Formation of the immune system as evidence of genomic plasticity

It is known that during the formation of acquired immunity, cells of the immune system may acquire new genes that are not characteristic of the main human genome. This happens depending on the influence of the environment on the organism - on what viruses and alien agents the organism will be infected during ontogenesis. Indeed, it is clear to all sensible scientists that at the time of fertilization it is not yet known under what conditions the individual development of the organism will take place. We inherit only part of the immunity, and therefore the immune system of humans and many species is a dynamically changing system. And this is another confirmation of the inconsistency of the concept of the totipotency of all cells of a multicellular organism and indicates the validity of the concept of genomic plasticity [21,22].

Conclusion

Based on the above viral theories, our classification of the genome into the main and acquired, as well as the nano-model theory of the functioning of the genome, we can conclude that humanity has been involved in obtaining genetically modified people for many centuries, and does not even realize it. A vivid example is the world education system (schools, colleges, universities, etc.). The activities of various security services in the preparation of military and special agents can be considered an example of obtaining a genetically modified person. The preparation and transformation of a person by terrorist organizations to create a suicide bomber is also one of the examples of human genetic modification. In this regard, various religious and public organizations, the media, medical institutions and of course science have a big impact on the human genetic structure. The goal of science is to help human society fi-

nally correctly understand the processes occurring in society and nature in order to overcome their unreasonable fear of the future.

Thus, the successes of biological sciences at this stage of development provide guarantees for the stable and safe development of mankind; it is only necessary to revise the modern education system [20] and health care system [19].

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