Congenital Programs of the Behavior as the Unique Basis of the Brain Activity

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Abstract
The problem of adaptation of an organism to varying environmental conditions has been considered. It has been shown that an organism cannot learn if aprioristic information about an object is absent. The entire behavior of an organism is controlled by congenital programs. New programs of behavior do not appear during the lifetime of an organism. At the same time, the estimated quantity of information necessary for control of an organism shows that genes cannot contain all this information (the problem of the number of links between neurons and the problem of the number of antibodies). Models were proposed for the behavior control of organisms, in which the stores of the congenital information are (1) the complex internal structure of elementary particles and (2) conformational degrees of freedom of proteins (not coded by genes). In the first case, a particle may represent a quantum computer with many degrees of freedom. According to this model, biologically important molecules (DNA, nucleotides, and proteins) can change their state under the control of internal degrees of freedom of an elementary particle.

Key Words: elementary particle internal structure, learning, congenital programs of behavior, conformational degrees of freedom of proteins.

Introduction
A series of papers, which actively discuss the quantum nature of the brain activity, has appeared in the last decade. For example, a number of researchers supposed that neuronal cytoskeleton elements can work as a quantum computer (Tegmark, 2000; Hameroff, 2002; Georgiev, 2004). However, it is not clear why one needs consider the quantum model? Are classical models of neuron networks unable to adequately describe the work of the brain? If so, it is necessary to make appropriate estimations and reveal possible contradictions in classical models or find facts that cannot be explained by classical models.

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On the other hand, quantum models have significant drawbacks. One of them is an overestimated decoherence time. It is known that the creation of quantum computers encounters considerable difficulties. Among them, a very small lifetime of complicated states in the continuous environment with a constant thermal movement can be mentioned as a major difficulty.

**Do classical models of behavior have contradictions?**

The ability of animals to learn, that is, react adequately to appearance of an unknown image in their sight, is considered as one of basic properties of living systems (see, for example, McFarland, 1985), which was modeled time and again (Bush & Mosteller, 1955; Staddon, 1983; Bergman & Feldman, 1995; Dukas, 1998; Kerr & Feldman, 2003). It is generally agreed that some part of information about the state of an organism is encoded in genes (is congenital), while the other part is acquired during learning by experience. However, mechanisms of learning are far from being clear. In particular, a detailed analysis of the means by which an organism receives information about the environment and makes decisions on adequate actions reveals a contradiction. The present paper deals with an alternative model of the behavior of organisms, which is based on the operation of aprioristic programs.

**1. The Model of Pattern Recognition and Decision Making by an Organism**

Let us model an organism as an open system recepting the environment and making decisions in accordance with the acquired information. The term "an organism" will imply not only higher animals, but also the protozoa, which are also capable of elementary forms of adaptation to the environment. We shall consider a model of an organism including a receptor, which registers the state of the environment, interrelated degrees of freedom, which process a signal by a priori available programs (compare a signal with standard samples) and make a decision, and effectors acting upon the environment (Figure 1).
An organism is constructed so that relations between elements (independent degrees of freedom) can be durable and stable. They do not disappear spontaneously and their characteristic energy is much larger than the thermal energy of molecules. A, B and C represent standard samples. In other words, these are such states, which are activated after the image recognition problem is solved. The standard samples have unequivocal strong relations with effectors, which influence the environment in some way.

The challenge is to understand how an organism learns. That is, why it behaves itself more adequately with time than at the moment an unknown image appeared in the environment.

Let us make some comments concerning the scheme given above:
1. The recognition and decision making scheme can be constructed hierarchically when the comparison is made first with rough standard samples and then with more detailed ones, etc. In this case, decisions made after initial stages of recognition will be less adequate.
2. Regular features of the time behavior (recurrence of signals) represent a particular case of other regular features and they fully meet all the conclusions drawn in this study.
3. We shall assume here and henceforth that recognition of images and decision making are accomplished quicker than changes occur in the environment. The opposite obviously corresponds to an inefficient organism, since it will not have time to adequately react to changes in the environment.
4. Notice that measurement and recognition do not differ fundamentally since measurement also represents a comparison with standard samples. Measurements are separated essentially because decisions are made not immediately after measurement, but only after recognition of images. This situation arises because measurements describe the world too roughly and any decision made immediately after measurement will lead to an inadequate response.
5. One of actions concerned with decision making is the accumulation of information about previous measurements and actions.

Let us characterize the state of organism effectors by variables $X_i$ and the state of the environment by variables $Y_K$. Notice that the following regions of $Y_K$ values can be distinguished in the environment:
2. Fitness of an Organism

Actions of an organism and changes in the environment have a relationship, which allows an organism to survive in varying external conditions. A particular case of this relationship is the stimulus-reaction dependence. We will characterize the adequacy of actions of an organism using the fitness function \( F(X, Y) \). The more adequate is the action of an organism in response to the appearance of a new signal in its sight, the greater is the fitness function.

If fitness, at which the state of effectors does not depend on the state of the environment (actions of effectors and the state of the environment do not correlate), is taken as zero, the presence of programs in an organism will always imply a positive fitness.

It is easy to see that if environmental changes occur in the region 1, fitness is zero, because the organism does not know about changes, which take place in the environment. In this case, a zero correlation between \( X \) and \( Y \) will be preserved in the future too.

The case, when \( X \) is in the region 3, is a trivial consequence of the presence of programs in an organism. The organism recognizes images and adequately reacts to a change in the environment.

The case 2 is remarkable. So, some change occurred in the environment, which was registered by a receptor, but the signal from the measuring device does not change the state of the effector (the organism does not perform any actions). Obviously, fitness is zero again because of the absence of correlations.

3. Adaptation to the New Leads to a Contradiction

Is it possible to arrange so that fitness is enhanced with time thanks to an adequate response to an initially unknown object? This just means that the organism has adapted itself to the unknown (that is, it learned). The following algorithm of actions of an organism has been

Fig. 2

1 - The region beyond the perception of receptors, 2 - the region, in which the receptor operates, but the received image does not correspond to any of standard samples, 3 - the region of parameters of the environment corresponding to standard samples.
universally accepted. If a new image appears in the sight of an organism, it must be written in the memory and used later as a new standard sample (see, for example, Kerr & Feldman, 2003).

Let us show that the problem of adaptation to unexpected events cannot be solved. We shall consider first the case when both the receptor and the system of decisions work swimmingly. The presence of noise is a random process by definition and will reduce the correlation in all the cases (region 1, 2 or 3).

We shall consider also a simple scheme of image recognition when hierarchical recognition is absent and a decision is made immediately after recognition. In what follows we shall show that a hierarchical structure does not lead to fundamentally new results.

Can an organism use the stored information about previous measurements? Since the system does not contain errors, measurements will give one and the same measured value ($n$ times). In this case, the scheme of recognition can be pictured as follows (Melkikh, 2002a):

Let a program for creation of a new standard sample from an unrecognized image is available. However, the start of the program requires a criterion, by which it would create a standard sample for a particular set of input data. What is a new standard sample? Of course, it is not simply an image entered in the memory (it is senseless to compare an image with itself), but also is some system of actions related to the existence of this standard sample. That is, creation of a new standard sample means entering a new image in the memory and provision of a system of links with effectors, which is activated when just this image is recognized.

The system needs a criterion, which would increase its fitness. However, since the image is not recognized (it is in the region 2), no such criterion exists. Thus, the assumption on the
availability of such program has led to a contradiction: it will not be started. Moreover, the very existence of a program for creation of new standard samples results in a contradiction. On the one hand, this program should exist a priori (i.e. before the presentation of an image; in this case, the type of objects to work with should be specified) and, on the other hand, the program cannot work with an indeterminate object. Consequently, such program cannot exist.

Now it is clear also that a hierarchical structure of recognition will not give new results either. If a decision is made at a level where recognition has been realized (a new image has been referred to some rough class of phenomena), the problem of adaptation to the new does not exist (the image at this level is not new). If an image is not recognized, the aforementioned scheme, which leads to a contradiction, operates.

Thus, we have come to the conclusion that an organism cannot adapt itself to an unrecognized object.

4. Learning by the Trial and Error Method

Is it possible anyhow to use results of previous measurements and actions for adaptation to a new situation?

In this case, self-learning in such systems involves the following process (Minsky, 1987; Sloman, 1993; Beal, 2003):
− patterns are recognized;
− if a pattern is recognized, aprioristic programs are initiated;
− if a pattern is not recognized, results of previous measurements and actions and their fit (or unfit) to the desired result (to the extent the purpose has been achieved) are remembered;
− some weight (value) is assigned to each result;
− if a similar signal arrives at a later date, a program, which suits best the task regarding the performed experiments, is chosen from the set of possible programs. In this sense, some authors (Beal, 2003) use the term “casual learning” assuming that possible actions are searched randomly.

It is easy to see however that this algorithm can be realized only when the intellectual system has some aprioristic information about the object! That is, for example, a designer imparts some additional (stand-by) properties to a machine, which can be useful in some situation. Of course, he must know what situation (or a class of situations) is meant, otherwise the criterion for the process optimization is lacking. Thus, aprioristic information about possible objects is incorporated in the structure of such an intellectual system. It is this aprioristic information that provides the criterion for establishment of a set of possible commands of behavior.

When we mean a situation considered in the present paper, that is, the absence of any aprioristic information about an object, then there are no grounds to assume that “standby” properties of effectors (whichever they are) will solve a problem. We have not any criteria for selection of particular properties of an organism. It is absolutely impossible that the problem is solved by chance, since we imply a macroscopic system with a multitude of degrees of freedom when the probability that a problem is solved incidentally is negligibly small.
Thus, aprioristic programs, which are incorporated in an organism and suit best particular conditions, are only selected during “self-learning”. The problem of learning is unsolvable in the absence of aprioristic information about the environment.

5. Transfer of Experience from Parents to Descendants

Let us consider the case when an organism receives new information from its parents or other animals. Can it adapt itself to new conditions in this case? Considering what has been said above, the answer is negative.

It is important to note that in this case too the organism receives information via receptors. Therefore, any other organism (a member of the pack, the parent, etc.) is interpreted as part of the environment. Consequently, the aforementioned scheme measurement - recognition - decision making holds. Whatever actions the parent makes, they can be adequately interpreted only in one case: when the signal has been recognized, that is, has been compared with a standard sample. This comparison is possible in turn only if the standard sample has already been available in the organism (has been congenital).

What is the role of the experience transfer between animals? This role obviously reduces to triggering of aprioristic (congenital) programs of behavior. Indeed, if the environment has uncertainties, an important question is which programs to start. The start of behavior programs, which are not adequate to changes in the environment, can be catastrophic for an organism. Therefore, we shall consider a situation (which is most frequent) when errors occur during reception of the environment.

6. Repeated Measurements as the Basis of a Conditioned Reflex

Errors occur each time the device measures the environment, leading to the possibility of erroneous recognition. Therefore, the larger is the measurement error, the smaller is fitness (fitness is a maximum if errors are absent). We shall label the maximum fitness as \( \Phi_0(X,Y) \). Then it is possible to write (if errors are relatively small):

\[
\Phi(X,Y) = \Phi_0(X,Y) - \Delta,
\]

where \( \Delta \) is a positive value denoting the decrease of fitness resulting from a measurement error. From the theory of errors it is known that a random error decreases during repeated measurements as the number of measurements increases (if a systematic inaccuracy is present, it can be included in the maximum fitness). On the other hand, each measurement requires energy and, therefore, fitness will decrease. We shall label the decrease of fitness caused by the energy consumption for one measurement as \( \epsilon \). Then we shall have for fitness:

\[
\Phi(X,Y) = \Phi_0(X,Y) - \epsilon n - \frac{\Delta}{\sqrt{n}},
\]

where \( n \) is the number of measurements.

The factor \( 1/\sqrt{n} \) appears owing to the decrease of the random error during repeated measurements. This formula can be written for the case when the measurement time is small as compared to the characteristic time of behavior. Oppositely, when measurements are slow, fitness will decrease, because the organism will not have time to measure quick changes of
the environment.
Fitness (1) may have an extremum with respect to \( n \):

\[
\frac{d\Phi}{dn} = -\varepsilon + \frac{1}{2} \frac{\Delta}{n^{3/2}} = 0.
\]

Then we have for \( n \):

\[
n = \left(\frac{\Delta}{2\varepsilon}\right)^{2/3}
\]

and

\[
\Phi(X, Y) = \Phi_0(X, Y) - \varepsilon^{1/3} \Delta^{2/3} \left(\frac{1}{2^{2/3}} + 2^{1/3}\right).
\]

Since the number of measurements is an integer, the extremum exists only at \( \Delta/\varepsilon > 2 \).
Therefore, an organism, which is in a complicated environment, may find it unfavorable to immediately change its behavior as the environment is altered, but prefers to perform a set of measurements and only then begins to act. In other words, to start particular available programs, an organism should first recognize the environment it is in and determine which programs are necessary.

This behavior of organisms explains well the fact that, for example, living organisms form conditioned reflexes most often as a result of multiple recurrence of an external signal. It is commonly thought that such recurrence causes learning of organisms and development of new programs adequate to a new state of the environment. However, it was shown above that such programs cannot appear.

Thus, repeated measurements of the state of the environment by an organism decrease the error during operation of aprioristic programs.

What is the difference between conditioned and unconditioned reflexes? Since aprioristic (congenital) programs operate in both cases, these types of reflexes have not fundamental differences. The only difference is that in the case of conditioned reflexes an image is generally presented several times. However, this difference cannot be viewed as a fundamental one, because instances of seemingly instantaneous learning («insight») have been reported (McFarland, 1985). At present such facts can be interpreted as operation of congenital programs, that is, an unconditioned reflex.

7. Conformational Degrees of Freedom of Proteins as a Possible Store of Non-Genetic Information
Considering what has been said above about the impossibility to acquire new valuable information by an organism, a question arises at once if all information about the behavior of an organism is encoded in genes? Indeed, elementary calculation shows that the amount of information in genes is much less than the amount necessary, e.g., for the higher nervous activity. For example, the number of nucleotides in the human genome is about \( 3 \times 10^9 \), whereas many more nucleotides are required to recognize just only visual patterns during a short time.
Let us show that information stored in genes is not sufficient for realization of many functions in higher organisms. For this purpose, we shall consider three problems:

- the number of antibodies;
- the number of synaptic contacts between neurons;
- complexity of receptors.

According to experimental data, the number of substances, against which an organism can produce antibodies, is extremely large and amounts to a few millions (Steele et al., 1998; Steele & Blanden, 2001). These substances also include those, to which an organism cannot adapt itself in principle during the evolution (they have been synthesized just recently). Researchers (Steele et al., 1998; Steele & Blanden, 2001) considered this problem and showed in particular that the genome has not enough space for encoding of this volume of information. They proposed a possible solution of the problem, by which an appropriate cell of the immune system is selected through the Darwinian mechanism. This cell survives and gives descendants having appropriate antibodies.

However, the proposed solution is not satisfactory for the same reason as “casual learning” does not work. Indeed, each cell of the immune system performs the same actions as the organism as a whole: it recognizes images and makes a decision. If a cell does not have an aprioristic criterion according to which it should perform preset actions on some substance present in the environment, the cell cannot make a decision. At the same time, searching of all variants for possible substances is a task, which is absolutely unreal even for all cells of the immune system.

The second problem is that the growth of dendrites and the formation of synaptic links is quite determinate (DiAntonio et al., 2001; Alberle et al., 2002), but these links make to about $10^{14}$ (for example, in the human brain). The volume of information in genes cannot present the basis for construction of a control system, by which every individual neuron would form links with particular neurons.

The third problem is connected with complexity of receptors (sense organs). Sense organs of animals often represent extremely perfect systems, which are capable of recognizing a large volume of information. For example, the volume of information received by an eye can be evaluated from its angular resolution and the number of recognized color shades. If it is assumed that the angular resolution is 1', the viewing angle is 45°, and the number of color shades (together with the number of recognized colors) is about 1000 (or even more), we shall have about $10^{8}$ bits. Other sense organs (smell and hearing) will give the same or a larger quantity. However, for such a system to be encoded in genes, they should contain at least the same volume of information.

Thus, one may draw a conclusion that information stored in genes is obviously insufficient for the organization of such a complex system to control an organism. On the other hand, it was shown in the foregoing that an organism cannot acquire new information during its lifetime.

However, this paradox is just apparent. The thing is that when biological information is concerned, one usually takes into account information, which is stored in the sequence of DNA nucleotides. However, this information is far from being exhaustive! It is well known that DNA encodes only the sequence of amino acids in a protein rather than its conformational state. But a protein molecule has a host of possible conformational states...
When a protein is in a solution, the number of these states is usually small. However, most proteins are built into biomembranes. In this case protein conformations are unambiguously determined by their environment (including other proteins). For example, proteins organizing ion channels may have a set of states whose switching depends on the membrane potential and the presence of various substances inside and outside the cell (Caterall, 1995; Sperelakis, 2001). Networks similar to neuron ones can be realized on the basis of proteins (Bray, 1990; 1995; Bray & Lay, 1994).

The solution can be found if it is assumed that a gene represents a hierarchical system, which stores not programs of behavior, but only indices of these programs.

\[
\begin{array}{c}
\text{Indices - genes (high level of control)} \\
\vdots \\
\text{Congenital programs – proteins conformations (second level of control)} \\
\vdots \\
\text{Effectors actions}
\end{array}
\]

In other words, conformational degrees of freedom of proteins represent an additional (very significant) information resource. Then it is reasonable to think that conformational degrees of freedom of proteins have aprioristic valuable information (contain behavior programs of organisms in various conditions). Thus, information about behavior of organisms is congenital: some information is encoded in genes and the rest is stored in the structure of proteins.

It is important to notice, that the aprioristic information contained in proteins, finally it is determined by properties of elementary particles (a charge, weight, magnetic moment etc.).

8. Why Do We Think that the Man and Animals Learn?
The ability of the man and animals to learn is assumed to be one of main properties of intelligence. Are there any experimental data supporting this assumption? Is it possible to examine the behavior of the man and animals and, hence, draw a conclusion that they have adapted themselves to a new environment without an aprioristic program for actions in this environment?

It turns out that this conclusion is impossible! Indeed, it can be drawn if one knows that no such aprioristic program exists. To this end, it is necessary to know where the information...
about the environment and possible actions of the organism is stored exactly. Today we cannot specify for sure even the place where this information resides (for example, the role of intraneuronal processing of information is not clear). The more so, it is impossible to say what information is stored there.

Therefore, if we see that an organism has adapted itself to "unexpected" circumstances, it is possible to draw only one conclusion: the organism had an appropriate aprioristic program for its action!

9. Internal Structure of Elementary Particles. «Key-Lock» and «Armoured safe».

As it was shown above, all programs of behavior of organisms are congenital. However, there is a problem of storage of such programs. In addition to conformational degrees of freedom of proteins, the behavior of organisms can be controlled by one more means. A hypothesis about a complex internal structure of elementary particles and control of their movement was advanced (Melkikh, 2002b; 2004). It was shown that this structure of an elementary particle will not contradict modern experiments in certain conditions.

Let us assume (Melkikh, 2002b; 2004) that the Schrödinger equation (or a similar expression) represents a linear approximation of a more general nonlinear equation. This nonlinear equation may have both harmonic and nonharmonic solutions. Certain values of control parameters may lead to excitation of internal degrees of freedom (appearance of defects in the structure of elementary particles). This is an analog of quasiparticles like vacancies in a solid, excitons, etc. Defects in an elementary particle have an ordered structure (like, e.g., atoms in a protein molecule). Nonradiative transitions take place when the state of internal degrees of freedom is changed. These effects have long been known for solids.

Let us write a system of nonlinear equations describing the behavior of a particle as a whole and its internal degrees of freedom in the form:

$$
\frac{i\hbar}{\partial t} \frac{\partial \Psi_j}{\partial t} = \frac{1}{\hbar} \hat{H} \Psi_j + \frac{\partial}{\partial t} \phi_j, \quad \frac{\partial \Phi_i}{\partial t} = F(\Psi, \lambda_m).
$$

The subscript $i$ means the number of internal degrees of freedom of a particle. The operator $\Phi$ represents a pulsed control of the motion of a particle as a whole.

Such a system can be compared to an armored safe, which requires a lot of energy to crack it. However, if the code is known, these efforts can be minimized. The majority of biologically important reactions are arranged in this way: all of them are highly selective and practically do not occur in other conditions (the known "key-lock" principle). If a system contains more particles than a macromolecule, it will be even more selective. Thus, the control of internal degrees of freedom of elementary particles can be triggered by a code word of a large length. This operation is repeatedly duplicated to resist noise.

Since an elementary particle represents a part of the general information control system of the whole organism, it should have some peculiar attributes. In particular, many organisms use various receptions to hide information on them for survival. That is, an elementary particle can be constructed so as to prevent an outside interference in its
control process. For this reason, "standard" experiments with elementary particles, in which they are accelerated, collide etc., cannot provide information about the delicate structure of elementary particles. In these experiments the external effect does not correspond to the assigned code.

That is, if the external effect does not fit the "lock", the behavior of an elementary particle obeys laws of the quantum mechanics, which are fulfilled with good accuracy. If the external effect fits the "lock", properties of the particle change in a short time. Consequently, its trajectory is altered. Then the particle regains its initial condition.

Thus, the "lock" code and internal parameters of particles also contain all aprioristic information about the behavior of an organism made up of elementary particles. This information is congenital, but is shown in certain conditions only.

The mechanism of the pulsed control over the state of an elementary particle could be its short-term electric and spin polarization (appearance of dipole and quadrupole moments). This polarization will give an additional pulse contribution to the Hamiltonian.

What will be the result of such induced transition of an electron to one of its possible states? If the electron is part of a biologically important molecule (protein, DNA, etc.), this transition can change its conformation or chemical properties.

The next stage will be changes at the cell level: opening or closing of ionic channels, control of the active transport of ions, synthesis of some enzymes, operation of the mutation machine on the genome alteration, etc.

For simplicity, let us consider a macromolecule including a multitude of parts, which may have a large number of conformational states separated from one another by energy barriers. If these states are practically equiprobable, in the absence of external effects the probability that the macromolecule will pass to some (a priori assigned) state is very small.

However, the control of the state of, e.g., an electron may result in selection of one absolutely definite state of the macromolecule. That is, in actual fact, a simplest logical operation will be performed.
For example, morphogenesis can be controlled by the said mechanism. All necessary links between neurons are formed as the brain develops. In this case, the problem of the number of these links proves to be solved, because additional information is contained in internal degrees of freedom of elementary particles.

The operation mechanism of a quantum demon may consist in a resonance-induced infiltration through a barrier. Such mechanisms are well known in chemistry and physics. As is known, a catalyst may change the reaction rate by many orders of magnitude (this is especially true of biochemical reactions in a cell). Similarly, the lifetime of an atom in the excited state may change dramatically on exposure to some radiation (an induced transition). The operation of lasers is based on this effect. An alternative approach assumes a change in properties of a particle itself, while properties of the field remain unchanged.

One may think that the Pauli principle applies only to a particle as a whole and is invalid for internal degrees of freedom of different particles! That is, all elementary particles differ by their internal degrees of freedom, but they behave themselves absolutely alike outwardly (in the absence of control).

The time behavior of such a particle will look like the operation of a quantum demon. In this case, macroscopic experiments may reveal spontaneous ordering of a system (a decrease in the entropy). However, this violation of the second law of thermodynamics is apparent, because the entropy of a system of such particles will decrease at the expense of the increase in the entropy of their internal degrees of freedom (Melkikh, 2002b).

10. Commonness of Laws Governing the Behavior and Evolution of Organism. Extended behavior

Then the laws of evolution, thinking and morphogenesis can be universally termed as «an extended behavior» meaning both the behavior of molecules and the behavior of organisms during several generations.

It was shown by the author that the synthetic theory of evolution cannot explain the known origination rate of species (Melkikh, 2004). An algorithm of the deterministic theory, which is based on realization of an aprioristic program of evolution, was proposed.

Considering what has been said above, it may be concluded that mechanisms of the behavior of organisms and their evolution have a common nature. In this case and other cases, the problem is the start of aprioristic programs. An accident plays a secondary subordinate role in all cases. The general problem of storage of such programs is encountered too.

Therefore the laws of evolution, thinking and morphogenesis can be universally termed as «an extended behavior» meaning the behavior of molecules and the behavior of organisms during several generations. The equation describing the extended behavior can be written in the form:

\[ \frac{dX_i}{dt} = f(X_k) + G, \]

where the first term on the right side describes the operation of aprioristic (congenital) programs and the second term covers casual processes. It includes mutations (casual
changes) of these programs (mistakes in the design of machines) and casual changes of the environment (their misoperations).

The main conclusion of this study is that mistakes in aprioristic programs do not lead to appearance of new programs (this process is too improbable). Then only a part is responsible for errors of machines. These errors always occur, but they do not cause the creation of new machines and programs of their behavior. They only impair their operation.

Wherever congenital programs are, their properties are finally determined by properties of elementary particles.

Conclusion
It was shown that an organism cannot adapt itself to an unknown environment. When a new unrecognized object appears in its sight, either aprioristic (congenital) programs, which will not be adequate, are started or no response takes place. An organism cannot create new standard samples on the basis of unrecognized images. Existence of self-learning programs leads to a contradiction. A storage model of congenital behavior programs was proposed. According to this model, all information about the probable behavior of an organism resides in 1) genes and conformational degrees of freedom of proteins and 2) internal degrees of freedom of elementary particles. In both cases congenital programs are predetermined by properties of elementary particles. The term «an extended behavior», which reflects commonness of the processes, was introduced for description of the evolution and the behavior of organisms.

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