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How did you Emerge from Decay?

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We already know a lot about the world around us and, in general terms, understand how things work. Of course, some problems have not yet been solved: the behavior of black holes, the mysteries of quantum entanglement, the transparency of dark matter. It is not clear how life aroses from the dust. However, we hope to eventually understand everything that we do not yet understand, be the cause we believe in the power of our minds. But the problem of the mind itself stands apart. There is nothing more complex in the world than consciousness. Here we have to comprehend ourselves and it is not entirely obvious that this is possible. Let's say the meat grinder is quite primitive, but she doesn't know it. It can be admitted that there is not even a scientific definition of consciousness yet [1]. More precisely, there are many of them, which, by the way, are one and the same thing. Instead of a definition, synonyms are often given.

Consciousness is understood as something volitional, higher, spiritual, ideal, immaterial, unknowable, irreducible, meaningful, experienced, mental, self-determining, contemplated, subjective, sensual. And this series is easy to continue All this are true, but not specific. The founding fathers of quantum mechanics understood consciousness as a special attribute of matter, such as extension, charge, mass and time [2]. This would mean that consciousness is inherent in any material object, and we would have slightly thinking electrons and more intelligent pebbles. One comes to such an assumption only out of despair in the face of the complexity of the problem. First of all, it is necessary to understand what we are talking about and what the features of the phenomenon are. It is quite natural to believe that consciousness is a product of life. So we immediately exclude thinking stones from consideration.

Animals undoubtedly have some level of consciousness. In recent years, evidence has emerged that plants also possess some kind of, most likely primitive, consciousness; they even exchange signals. This was not noticed for a long time, because the mental processes of plants are extremely slow. We cannot take the place of a bush, an ant or a mouse. Strictly speaking, each of us knows for sure about the existence of only our own consciousness. Even the psyche of the interlocutor is judged by his behavior and by analogy with himself. The presence of some kind of consciousness in a single cell is even more difficult to identify, although its existence is quite likely at the level of “I feel good” or “I feel bad.”

In any case, cells can change their behavior depending on the circumstances and enter into coalitions to facilitate the conditions of existence. But I would, of course, like to understand how this incomprehensible miracle of life arose from nothing. One of the most important laws of physics states that disorder is increasing in the world, and in order to recreate order in chaos it is necessary to expend work. For example, breaking a vase costs nothing, but not everyone can restore it. When in ancient times, in some miraculous way, something resembling a living cell, arose, it would have died immediately if it had not been able to protect itself from the environment and degradation. A tragedy can happen not only due to an external threat, but also due to some kind of internal failure, and with hard work, failures occur constantly. Therefore, a mandatory attribute of life is the ability to self-heal, homeostasis, with which living things behave expediently [3]. The creature that came into the world had to be able to assess the degree of its integrity and restore its well-being.

Bacteria stand apart, disproportionately simpler than the cells from which plants and animals are built [4]. Their life is short, a few hours, they do not need to be able to recreate the norm. There is an easier way out: split in two and each half will be identical to the original one. Most likely, bacteria have no need to improve their behavior, and they completely lack individuality. In a population, their relationships are limited by competition for substrate, predation, or symbiosis. Then a radical complication occurred, inorganic molecules successfully met and formed a living cell, so that it became possible to judge one’s state, perceive the environment, learn, set a goal, act, evaluate the result, and even enter into relationships with each other. It is not a very convincing script?

Of course, the genome is capable of improving through the selection in evolution of those random breakdowns that turned out to be successful. But the existence of the predecessors of the living cannot be long when they are not yet able to protect themselves. And they must manage to successfully break down in many places at once. Meanwhile, heredity depends on the influence of the environment, and then the factor of lucky accidents is not the only path of genome evolution. As discovered by L.B. Meckler, the spatial structure of a protein, on the one hand, is specific to its working substrate, like a key to a lock, and, on the other hand, it fits its DNA, too, like a key to a lock [5]. In any case, sometimes it is true. It turns out that the genome is a collection of copies

of those substrates with which we have to deal. This is how the primary genome of bacteria could be formed. The reader should be warned that the diagram drawn is by no means complete and needs to be improved. It only demonstrates that there is no reason to assume the participation of the act of creation in the emergence of life. Therefore, it is by no means excluded that the ability to reproduce arose spontaneously. But this is by no means the only useful skill; we are capable of more.

What Makes You You

Once having arisen, a living thing cannot exist without having some kind of, at least the most primitive, consciousness. It perceives some circumstances as comfortable, while others as alarming. Experiences the thrill of the joy of life, but sometimes feels the threat of death. Therefore, it seeks to avoid danger, and to an outside observer this appears to be a reasonable action. Anyone who evaluates his condition recognizes himself as something special, different from everything else, and strives to survive. Here we have made a logical leap. From material processes we abruptly switched to the ideal, the idol living inside us. Each cell of a multicellular organism contains its desire to survive, and their common intention to escape merges into the goal of the entire organism. Inside, as it were, there is a certain idol, whose only task is to survive. From homeostasis comes purpose. We do not have the opportunity to directly register subjective phenomena (except, we emphasize, our own). Nevertheless, it is quite possible to influence them, but we judge the results by indirect signs. We don't even try to explain how feelings are formed and where their substrate is. We simply postulate: if living things arose, then sensation also arose.

The simplest living thing, a cell, must feel the joy of life or the fear of losing it, otherwise it will not survive [6-8]. There is nothing more terrible for a living being than the prospect of imminent death. This sets it apart from inanimate nature. And this assumption is enough to explain all the subtleties of consciousness. A primitive creature, of course, does not understand what death is, but experiences an unpleasant experience when its condition worsens, and this increases anxiety.

There are many ways that a complex system can be damaged. It is unrealistic to program all recovery paths in advance. But if a defect is discovered, you can try options and then there is a chance to avoid danger. This is why the ability to assess one's position on the life-death scale is essential for survival. It is impossible to stay alive without the ability to heal yourself after a breakdown. It is easy to show that following the rule "if you feel bad about doing anything, and the worse you feel, the more intensely act", you will move away from death, and it is not necessary to make efforts in the right direction. Move randomly, somewhere. If you go wrong, the next attempt will be more powerful, and if the threat is gone, calm down [7,9]. This property is necessary for life, but it is not sufficient. In particular, an inanimate object capable of increasing its random activity when a certain parameter deviates from the norm will look like it is a little thinking. For example, Brownian particles shift in a random direction, but more quickly at high temperatures in their vicinity. And if a pole of cold is created in the environment, then this is where the particle's random wandering will lead, and this is even used when they want to clean a solution of contaminants. Therefore, the ability to self-regulate does not indicate the presence of a conscious goal; it is necessary that the goal be desired. Nature has endowed cells with the ability to remember which factors usually lead to trouble [10,11]. Therefore, consciousness is the process of assessing the degree of your safety at the moment, past events that are important for the present, and the future that you hope for or fear.

You Were Collected Bit by Bit

A goal is a favorable future option that once took place in your past, or even in the past of your ancestors. Cells and, first of all, neurons have a full-fledged chemical memory apparatus and rearrange activity during learning [11-14]. Neurons of the same organism receive different information from the body and the environment, and their memory does not completely coincide. Therefore, their contribution to the body's idol state differs. There are neurons associated only with the initial desire to survive; they are activated whenever there is a threat, regardless of the circumstances, and are almost not involved in learning, providing general protection for the safety of the body and self-esteem. Other neurons are connected in emergency cases, after comparing the current data with the memory apparatus. The brain is a collection of neurons rather than a construct [15-18]. The behavior is well described using fuzzy logic [7]. DNA transcription is known to influence subtle details of the body's functioning, particularly neuronal activity and behavior in general. At the same time, it was recently established that emotional experiences also affect the activity of genes and change behavior indirectly [19]. The inner world of a particular neuron cannot be overly rich. Most likely, his feelings are one-dimensional, he feels good or bad. It can be bad for various reasons, so when some neurons don't care, others are comfortable, and the majority may simply be indifferent. You feel the contribution of some neurons as hunger, others as fear, and others as thirst. And some - like your impressions of an unfamiliar bearded man with whom you accidentally got into conversation last week. Neurons reawaken memories that were once generated in similar situations. In addition, the experience reminds them of the anxieties they later experienced as a consequence of this experience. And all these elementary sensations of individual neurons add up to a kind of idol, which stores all your disparate experiences, simple and complex, in an inactive form, until some of them are needed to form behavior at the current moment. Then they go into an active form, and you feel like an active person. Sometimes it influences your behavior even if you don't realize it. Naturally, the next moment the idol will adjust the components of the spiritual tests. The idol is all of you, not you now. This can be described on an ideal level, but it is important to understand what is happening within the material world. Brain cells somehow join forces in the fight for survival. Neurons interact by exchanging nerve impulses that travel along the axon very quickly, it takes a fraction of a second. But not as fast as thought. A nerve impulse affects the object where it arrived. A hierarchy of neural activity is formed, each step in it takes time and takes a second, or even more. It is clear that this scenario is not suitable for enriching the sensations at the moment and merging them in your consciousness.

The problem can probably be solved by direct electrical connections between cells, called gap junctions [see 7]. They are formed by special proteins at the points of contact between cells. The cavities in each of the proteins, located opposite each other, form a tube that connects the protoplasm of neighboring cells. Neurons are able to regulate its conductivity on each side, depending on the current situation and accumulated experience. In addition to electric current, ions and small molecules pass through the contacts. This is how a united intracellular space of cells adequate for a given moment arises, a temporary organism within us. It lives while we experience this experience and is dynamically rebuilt along with our sensations.

It should be noted that the richest in such connections are astrocytes. So it is possible that neurons only serve astrocytes, and they are already the seat of consciousness. Event-relevant neurons in their place and time recruit astrocytes through gap junctions,

disseminating information almost instantaneously. Astrocytes bind together their internal environment, their experience, their capabilities into a temporary coalition and thus merge their simple sensations together. However, this is just a hypothesis for now. In everything related to consciousness, there are more hypotheses than real conclusions.

You and Your World

The organism, using the properties of its cells, their experience and current circumstances, creates in some ideal world a subject, an idol, which manifests one or another of its hypostases in time. But the idol does not hang in the void. The combination of factors that influence you form the environment in which you exist, and the image of this environment is gradually imprinted in memory as a whole. Elements of the self and elements of the background coexist in your inner world. But how can you distinguish which element belongs to you and which belongs to the environment, if both are virtual, just a figment of the imagination? In particular, what about your body? The personality is ideal, but the body is material. You, say, feel that the hand is yours. But the Self will not decrease if you lose an arm; the amputated limb may ache or itch. The criterion is simple. Yours is something that you have complete control over, that completely depends on you. You command your hand as you wish. Therefore, the hand is part of you. Elements of the external world can also be influenced to some extent, but sometimes completely. Your property, both real and virtual, is also a part of you, and this was not invented by man: a tiny animal protects the surroundings of its nest as if it were itself. Even those who are subordinate to you, if you have them, employees, servants, slaves are part of you. In the old days, a noble lady could take a bath in the presence of a footman, without perceiving him as a separate person. But the lamppost or unfamiliar bearded man that exists in your memory is not you.

The idol has at its disposal ideas about itself and the environment. These are events that once happened to you, your personal history, your beliefs and even elements of the experience of past generations. Traces of these events settle in memory, so that you yourself live inside and everything else is your world. In addition, these are countless facts that you have learned about in one way or another, although some of them never actually happened and live only in your imagination. An idol manifests itself only in appropriate situations. Consciousness is the state of an idol, limited by the strokes of a given moment. While servicing the idol, the consciousness is occupied with survival, self-affirmation and delight in oneself. You need to satisfy the idol's vast appetites to maintain life, expand your area of influence in order to make something useful for yourself really possible, grow, strengthen and not make enemies. All this is noticeable to outsiders, but narcissism is to a lesser extent; more often it hides in the subconscious, although this is the most powerful experience of an idol. It is provided by a relatively constant population of neurons, weakly related to current activity, but absolutely necessary in our cruel world. Ignoring her interests will lead to loss of the will to live and serious damage to the body. In addition to information that is important for life, a lot of unimportant information is stored in memory. Then, when the earthly path is over, it turns out that almost everything was unimportant, and it was not useful when meeting reality. Insignificant, but yours. How you sat on Uncle Monya's shoulders, towering above the crowd and holding his reliable head with your hands. How drunken sailors fought at the pier. How once a thick fog descended on your street and even the fingers of an outstretched hand were almost invisible. How at a nearby flea market you and Valerik , having escaped from your parents, looked at the countless treasures laid out on newspapers, and one thing was especially memorable: the sparkling copper eyepiece from the periscope of a submarine. I wonder where he is now?

You and Others

You perceive yourself at the center of your universe, you and everything else. You are, as it were, equal to everything that exists; this is a completely subjective feeling of your own greatness, although it is usually hidden in the depths of an idol. There is nothing shameful or despicable in this feeling. Life is a joy, and its loss is a disaster. You perceive it through yourself, otherwise it is impossible to do it. It would seem that there are many reasons to experience bliss and this is not always directly related to avoiding death, but this is not so, the connection may be indirect, but it always exists. For example, the strongest possible pleasure, sex, indirectly gives a chance to survive in offspring; sex is an alternative to death. Along with the exorbitantly high value of one's own person, the ability to feel the significance of one's loved ones and fellow tribesmen, each of whom is a little bit oneself, is by no means atrophied. In the depths of the subconscious, conscience sometimes awakens and this contributes to the preservation of your family. And this happens not only among us, the kings of nature, but also among animals, who sometimes risk themselves.

Why does each of us value our lives so much, what do we especially value? Individual experience that we collected through hard efforts, our achievements, good deeds that we sometimes decided to do? No, the importance of oneself exceeds all other values. Any person who is not too remarkable from the point of view of outsiders feels like the crown of creation, whose life is priceless. Without him, the world inside him will plunge into darkness. And with all this , we understand that the degree of individuality of the value of our personality is to some extent random. In the process of life, we experienced many chaotic influences on which our fate and our identity depended. This is called the butterfly effect: its accidental death weakly, but affects the characteristics of subsequent events. And the uniqueness of our inner world also depends on chance. Nevertheless, we value the image that has actually developed. And our complaints are not unique. For each of us there are a quarter of a billion insects, which are quite individual. True, their consciousness is served by only a million neurons, but in general they have thousands of times more nerve cells than ours, their world contains more information than ours. But, of course, we are far ahead in terms of the complexity of individual consciousness.

Where will your rich inner world go next? One inevitably feels something tragic, almost unnatural, in the fact that such a perfect person, unique, filled with information and grandiose plans, disappears without a trace after death. It was just there, and it's no longer there. The disappearance of consciousness after death seems logically unacceptable, although it is always easier to destroy than to create. When you leave this world, the little world in which you lived will remain for some time, your trace, weak or sharp, will remain. You are part of your world, it lives in you, and you live in the memory of its inhabitants, in the memory of your cat and your friend's dog. You sometimes come alive in their memories. But gradually all your acquaintances will also disappear, new communities will arise, and then they will leave too. Even the landscape will change. But the Moon will still leave a flickering path on the surface of the sea. The moon and the sea do not die. True, they don't live.

Only the things you managed to accomplish remain, ideas and accomplishments are preserved. And, unfortunately, villainy. Let's say that the feelings of a great poet live as long as the language in which he wrote lives. Millions of people feel the experiences and blissful peace that Johann Sebastian Bach once experienced. And yet, it is not he himself among us. Even if someone's achievements were grandiose, they don't remember him, they remember a myth, a legend composed by admirers. You, priceless, disappear. Involuntarily, those who are weak came up with consolation for themselves in the form of an immortal soul and the other world. But even 2000 years ago, Emperor Trajan and Pliny the Younger, in their correspondence, ironized about the hopes of the plebs for the afterlife. And perhaps someone will envy the weak. It's not a matter of fear of one's own death, it's only in the future, not right now. But when a father or daughter dies tragically, the hope that they continue to exist somewhere is comforting. Meanwhile, there is a way to extend intelligent life almost unlimitedly. Uniting in a team, flock or colony promotes survival. For example, the behavior of a huge flock of birds does not look like random movement of individual individuals. The edge of the flock can swing up or down. Then the birds all change their flight direction together. And suddenly, at some point, their coordination is disrupted, they move chaotically, and then establish contact again. Naturally, birds see their neighbors, but the consistency of their flights is one or two orders of magnitude more accurate than the time of their reaction to the behavior of their neighbors allows. Probably, being somewhat similar, they simply react similarly to some external signals, a gust of wind, loud sounds or darkening. Telepathy has nothing to do with it. But what if in the future different human personalities enter into a coalition and merge into a single consciousness, as, in primitive cases, sometimes happens in a crowd seized by a common impulse? Who knows, maybe someday we will learn to merge together subtle and, at the same time, heterogeneous human aspirations: science and technology are moving forward. So far we know of only one reliable example when brain cells join forces into the subjective world of the owner. Applied to humans, this would lead to the emergence of an inextinguishable superintelligence, physical laws do not contradict this. And if it happens, no one will know about it, just as single neurons have no idea about the existence of the "divine" soul of the ruler.

References

1. Samchenko VN (2010) Consciousness as a concept and phenomenon. Philosophy 1: 85-190.
2. Smith CUM (2006) The 'hard problem' and the quantum physicists // Part 1: The first generation. Brain and Cognition 61: 181-188.
3. Cannon WB (1932) The wisdom of the body. New York, Norton & Company 294: 1932.
4. Vedyaykin AD, Ponomareva EV, Khodorkovskii MA, Vishniyakov IE (2019) Mechanisms of Bacterial Cell Division. Microbiology 88: 253-271.
5. Meckler LB (1969) Specific selective interactions between amino acids residues of peptides chains. Biofizica 14: 581-584.
6. Sevush S (2006) Single-neuron theory of consciousness. Journal Theor Biology 238: 704-725.
7. Sandler U, Tsitolovsky L (2008) Neural cell behavior and fuzzy logic. Springer 478.
8. Ulric P Tse (2014) The neural basis of free will. Criterial causation. The MIT Press, Cambridge, Massachusetts 456.
9. Tsitolovsky LE (1997) A model of motivation with chaotic neuronal dynamics. Journal of Biological Systems 197: 301-323.
10. Anochin PK (1974) Integrative activity of a neural cell. Uspehi Fiziol Nauk 2: 5-76.
11. Tsitolovsky LE (2015) Consciousness, endogenous generation of goals and homeostasis. International J General Systems 1563-5104.
12. Sevush S (2006) Single-neuron theory of consciousness. Journal of Theoretical Biology 238: 704-725.
13. Tsitolovsky LE, Guselnikov VI (1974) About the nonclassical state of a neuron. Nauchn Dokl. Vish Shkoli Biol N 10: 36-47.
14. Shuman TJ, Cai DJ (2020) The role of intrinsic excitability in the evolution of memory: Significance in memory allocation, consolidation, and updating. Neurobiol. Learn and Memory. 173: 107266.
15. Nicholson DJ (2019) Is the cell really a machine? J Theor Biology 477: 108-126.
16. Tsitolovsky LE (2021) Homeostasis as the Chemical Basis of Consciousness. International Journal of Psychological and Brain Sciences 6: 17-28.
17. Tyssowski KM, DeStefino NR, Cho JH, Dunn CJ (2018) Different neuronal activity patterns induce different gene expression programs. Neuron 98: 530-546.
18. Shuman TJ, Cai DJ (2020) The role of intrinsic excitability in the evolution of memory: Significance in memory allocation, consolidation, and updating. Neurobiology Learning and Memory 173: 107266.
19. Dubnik R (2024) Programming of Transcription (POMC) and HPA Responses to Stress. Cancer Studies and Therapeutics 9: 1-5.