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Organic Matter -The Evolution of Life under geophysical Conditions

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Abstract

Intergalactic processes are shaped by the fundamental physical phenomena of magnetism, electromagnetism, gravity, etc. Their characteristics are extreme energies and dynamic forces. They are the cause of the formation of galactic systems as well as all phenomena in space. However, life forms cannot be derived from these conditions. The energy levels are extremely high and thus hostile to life. The development of life forms requires a reduction in energy levels, which can only occur in a shielded space. And Earth, as a habitable planet in our solar system, offers such a space. Galactic developments are shaped, among other things, by the kinetic energy flows of the zokumgalectic medium and their physical and quantum mechanical laws. Within the framework of dynamics, it can be assumed that organic molecules could form through the contact of various atoms. But the energetic conditions in space were too strong for the evolution of complex molecules or organic molecular systems. Furthermore, water was missing as a fundamental reactant, which in space exists almost exclusively as amorphous water [5] and lacks the properties typical of Earth. The conditions that make a planet a habitat capable of developing life forms will be demonstrated.

Keywords: Geotectonic living conditions, Earth magnetism, Primordial atmosphere

Introduction

The physical conditions of Earth changed drastically with the formation of the planet, but remained largely dynamic. With the cooling of the planet, the presence of liquid water, and with it the possible entry of the first organic molecules formed in intergalactic space, these molecules became active. Modern scientific research seeks to identify the energetic and structural processes that can ultimately clarify the fundamental chemical conditions. The discovery and development of mathematical models and attempts at explanation play a major role in this. From the perspective of biological thought, these may appear "rigid." However, the mathematical-physical definitions as laws of structural systems also contain the possibility of interpretation and proof of dynamic biological processes.

Discussion

Considering the processes during the development of organic life forms solely as biochemical processes is not sufficient. The development of organic systems occurred within a complex system of interacting processes, in which geophysical processes represent a significant aspect.

The macrocosm and microcosm are governed by the laws of nature, so it initially seems sensible to turn to the physical conditions within the molecules, i.e., to examine the physicochemical processes. Carbon [9] is at the center of the formation of organic compounds. Due to its special electron configuration, it has the ability to form complex molecules. Carbon can occur via covalent bonds, both as single and multiple bonds, as well as in ring-shaped compounds, as seen in the amino acid-like primordial atoms. The ring-shaped bond forms of carbon develop as polymers into a variety of compounds with a wide variety of modes of action. In addition, there are nonpolar carbon chains that, via van der Waals forces, lead to induced dipoles with weak bonding capacity. As mentioned above, amino acid-like molecules have been detected in interterrestrial material. This points to the fundamental importance of the physico-chemical properties of carbon, which can be considered as the basis for the development of life forms in the terrestrial environment.

Nevertheless, the presence of water is the basis for the initial development and further development of organic matter. Intermolecular interactions such as dipoledipole interactions, van der Waals forces, and hydrogen bonds, known as salvation, occur on this basis. Within the framework of this development, not only complex molecules are formed, but it is also natural that additional atoms are acquired, such as nitrogen, phosphorus, oxygen, and other elements, which are ultimately required for more advanced structures for modern life.

To understand the mechanisms of atoms and the mutual influence of water present in contact with early organic molecules, one must resort to mathematical models. Our current understanding is primarily based on physical-chemical reaction processes.

However, nature is characterized by an effective conversion of energetic influences, which, based on current knowledge, are not yet fully understood. One can expect that quantum mechanical processes play a crucial role in biology, which are still unexplained. Studies of highly developed biological systems and their metabolic activities indicate this [6].

The Marcus theory, based on the Eyring theory, demonstrates this in redox reactions as a single-electrode exchange reaction with the solvent and allows the calculation of the Gibbs free energy of activation, i.e., the difference in enthalpy in the transition state and the free energy of the redox reaction, from the polarization properties of the solvent, the conditions of the electric and magnetic field, the size and distance of the reactants during electron transfer, and the free energy of the redox reaction. The formation of high-energy biochemical compounds is based on quantum physical phenomena, a sequence of processes that can lead to diverse forms whose structures are logically unpredictable [1].

It therefore remains to be stated that the development of organic compounds, and thus of life forms, appears to proceed continuously and is dependent on external conditions such as magnetism, electromagnetic phenomena, and resonance energy [4]. Magnetism plays a special role in this process, since, as a transmitter of resonance energy, it influences the nuclear spin behavior, which influences the magnetic properties of atoms, and the electron spin behavior. These concepts, introduced in theoretical physics, are likely also of importance for molecular character and their further development.

But continuity was and is fundamentally not present. Geological science is revealing new details. The Earth's magnetism depends on the dynamics of the Earth's core, so that when considering the origin of life, one must consider the Earth's geodynamic processes. The movements of the Earth's core and its outer zone do not move uniformly over the temporal dimension of Earth's history, resulting in fluctuations in the intensity of the Earth's magnetic field. This could, as J.A. Tarduno [8] suggests, have had a significant impact on complex biological matter. A changed and weak Earth's magnetic field influences organic life by reducing its ability to defend itself against the solar wind emitted by the Sun. The extent to which this interpretation influenced the first early organic molecules and their further development remains unclear. However, damage to highly developed living beings is certain. One must also consider that today's primitive life forms have a significantly higher resistance to environmental influences. An evolutionary adaptation?

A further connection to this geotectonic dynamic leads to the question of where the oxygen needed for the metabolism of animal life came from. It is assumed that the enrichment of the atmosphere with oxygen occurred through the appearance of cyanobacteria in the Ediacaran. And this is undisputed. But bacteria are highly complex systems with their own metabolism. This represents a quantum leap compared to simple molecules or molecular complexes. However, it is likely that compounds containing oxygen also appeared in the development of the first organic molecules. Therefore, the assumption that the sudden appearance of oxygen molecules is not satisfactory. For a more comprehensive explanation, one can turn to geotectonic and geothermal processes in Earth's development. The impact on early and existing life forms, on the one hand, and on immediate reactions of atmospheric composition, on the other, must be considered separately. As already mentioned [2,8], the weakened magnetic field may have led to light atoms such as hydrogen, separated from water molecules, being released into space through tectonic processes as a result of the intensified solar wind, leaving the oxygen content in the atmosphere. These recurring tectonic processes may have led over time to increasingly higher oxygen concentrations, not only in a developing atmosphere but also in the world's oceans. While oxygen is sparingly soluble in water, its solubility increases with increasing pressure. Since it is assumed that air pressure was elevated in the early atmosphere, one can imagine that even low concentrations in the atmosphere led to increasingly sufficient concentrations of oxygen for further biochemical processes. This idea must be considered an assumption.

Consequently, it is not undisputed. But the core of the statement contains an undeniable logic. An abiogenic development of oxygen in the early developing atmosphere, whatever its nature, is to be assumed.

One can also speculate that oxygen, which did not originate in primordial nucleosynthesis but is present in space, may have reached Earth along with water. The presence of water in space refers to the state of amorphous water ice, whose physical state does not correspond to that of Earth [5]. The contact of early stages of organic compounds with this state of amorphous water cannot therefore result in any mutual influence favoring further development. The changes in the physical properties of water in contact with Earth enabled a new quality of reactivity. The decreasing temperature and the stabilizing magnetism reduced the diffusion of gases into space and enriched the oxygen concentration, allowing the formation of an atmosphere in the modern sense to develop.

The process of the emergence of life on Earth must be viewed as a dynamic event. Nevertheless, stages of development are recognizable:

i. Based on primordial nucleosynthesis, atoms emerged, which, with their structure and energetic properties, created the conditions for the formation of a wide variety of structures that became the basis of inorganic and organic compounds.

ii. The first early organic compounds developed according to physical and chemical laws, such as methane compounds and amino acid-like structures in space.

iii. According to chaos research, there is the potential for a system to behave chaotically to its advantage. Through targeted perturbations, different periotic movements can be controlled and stabilized in the chaotic realm. In this sense, nature uses these regulatory mechanisms to respond to changing conditions. This is a mechanism that applies to all processes of life's development [6]. In this process, carbon plays a special role due to its electron configuration, which enables it to undergo allotropic phase transitions and chain formation.

iv. With the entry of such organic compounds into the Earth's environment, the extreme physical influences of space, which until then had made the development of organic matter impossible through extreme magnetic fields, radiation, etc., were reduced.

v. Contact with water became crucial.

vi. The geotectonic and geothermal conditions of the early Earth led to the development of an atmosphere, which led to the further development of organic compounds.

vii. The compounds increasingly differentiated through high-molecular structures, which ultimately, due to their internal physical properties, increasingly led to autonomous entities. This is how the first highly complex structures developed, of which, according to current knowledge, cyanobacteria became the basis for differentiation into a diversity of life.

Panta rhei. It is quite understandable that the tendency of life's development carries a philosophical perspective. Based on Heraclitus's theory of flow, this metaphor is an expression of being as the becoming of the whole, which is not static. Rather, it involves eternal dynamic change. In this flow, unity stands as unity in diversity, and diversity in unity [3].

Conclusion

The development of organic matter is a dynamic, autonomous process. From the energy following the Big Bang, the current structure of the universe, and thus our solar system with Earth as a part of it, emerged through drastic physical transformation processes. Its inherent characteristics enabled the development of life forms. Early simple organic molecules evolved under the influence of water, the partially allotropic properties of atoms such as carbon, and the earth's geotectonic and atmospheric conditions. Chemical evolution occurred based on the physicochemical properties of the molecules. Compounds increasingly formed whose physical properties enabled intermolecular interactions, thus leading to the development of new, functional, autonomously reacting structures.

The physical and chemical properties of matter are shaped by natural laws. Magnetism, electromagnetic radiation, gravity, and energy determine the processes that, in the subatomic realm, establish the prerequisites for functions and processes. Seen in this light, energy is the basis of all events. Or, as W.K. Heisenberg put it, "energy determines matter." This idea, which determines the basis of life, clarifies the unity of all biological matter. Separation from biological diversity is therefore not possible. Everything is subject to the same developmental principles. Thus, one must also note that the human organism is no exception. It is part of the system. The idea that humans or human society could subjugate nature is a fatal error.

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