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Relationships Between Internal Physical Conditions and Chaos in the Development of Organic Matter into Life Forms

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Abstract

The emergence of life forms and of life as a whole on Earth or an Earth-like planet is a complex process. It encompasses the scientific content of the various branches of knowledge such as physics, quantum mechanics, physical chemistry and chaos research, which seem to flow together under the concept of biology. In fact, each of the disciplines mentioned has its own inherent ideas and basic concepts. But it is becoming increasingly clear that a mutual rapprochement is necessary and also required. For example, chaos research, which is per se a predominantly mathematical model, but whose basic principles can also be used to develop biological processes in a model-like explanation. In this way, basic scientific directions are gradually growing together. This is the great progress of our time. The great idea that once seemed abstract becomes more alive. You just have to learn to see it and work on it.

Keywords: Early life forms, Chaos, Physical processes

Introduction

Life is a fascinating mystery that has always preoccupied humanity and has led to a wide variety of evaluations and attempts at interpretation over thousands of years. One of the questions that arises is whether life is only a phenomenon of planet Earth or can it be universal? With the increase in scientific thinking, a mechanistic view of the classification of life processes based on natural laws developed. A milestone in this way of thinking and its significant spread was triggered by *C. Darwin's* postulate of the explanation and further development of life forms. With the differentiated further development of the natural sciences such as physics, physical chemistry, quantum mechanics and systems-analyzing scientific disciplines, insights into life processes were promoted that increasingly explain the dependence of life processes on laws in their origin and further development.

Discussion

Chaotic behavior is a widespread phenomenon in nature. If one takes into account that a large number of substances and organic compounds are present in space, the question arises as to how to organize a system that ultimately promotes the development of organic matter - natural laws and system behavior such as dynamics corresponding to chaos are the foundations.

These mechanisms enable the effective transport of mass and energy. This means, however, that the chaotic system behavior must be recognized as a periotic system. Numerous investigations and considerations in the 1990s on explanations of chaos, which were initially primarily aimed at clarifying technical problems [3, 5, 8, 9], nevertheless allow the idea of an explanation of biological processes. It is quite conceivable that such regulations take place in the system of the universe and its energetic conditions and that they are thus the basis of such regulatory mechanisms. Due to kinetic energy, atoms and existing organic compounds are formed into more highly developed molecules. It was only in contact with the physical and chemical conditions of the early Earth that organic matter was formed and further developed. The decisive statement focuses on the fact that chaotic aspects play a role in the development of life forms.

As the teams around Ott and Romeiras show, a chaotic system can be transformed into a periotic sequence by stabilizing an unstable system through perturbation. This could explain how a new system can develop through different periotic developments.

A new system of nature? The chaotic behavior of organic compounds, which develop into new and differentiated chemical compounds as a result of conglomeration, will change the entropy of the system. If we assume that the system of the universe is a "closed" system, then the entropy increases in irreversible processes. Such processes occur independently. With the development of a new system, the new biochemical constellations of the Earth system, the state of a closed system changes into an open one in which the exchange of energy and matter creates new physical conditions. Thus, it can be said that every chaotic system can be considered a vehicle that transforms microscopic fluctuations to a macroscopic level [7].

The energetic effects on atoms, molecules and the first organic compounds are caused by magnetism and its magnetic fields and the resulting resonance energies on matter, electromagnetic radiation and the kinetic energy of space. The development of life forms is determined by the compatibility and incompatibility of physical laws and the lawful conditions of chaos, which lead to the formation of morphological structures. The driving force lies in the presence of energy.

Nevertheless, the development of life in space, or rather of early life forms, can be viewed as a "closed" system that also sets limits to the further development of these existing organic substances. Only the contact of such molecules with water changed the environment and created the possibility of further development. Water itself exists in space. But according to current knowledge, it is mainly in an amorphous state in which water does not have the properties of liquid water. This means nothing other than that extraterrestrial organic molecule only encountered a changed "environment" through contact with water on Earth, which formed new energetic conditions and thus enabled the development of life forms.

The dynamics of the high-energy conditions of space, shaped by physical laws and also the conditions of mathematically defined chaos, broke off with the formation of the Earth as a planetary system. New conditions developed. Low-energy regulatory bases emerged. This created space for a variety of developments. It could also have happened on other Earth-like planets that, when they were formed, developed their own energetic field that was separate from the system of space.

Such a variety of chemical compounds emerged that ultimately, via high molecular structures, led to life forms that correspond to today's concept of life. *E. Schrödinger* tried to summarize this by saying: "Life seems to be an ordered and lawful behavior of matter, which is not based exclusively on its tendency to change from order to disorder, but partly on an existing order that is maintained" [6].

The dynamics of the driving forces must be considered separately in terms of their effect on the system of organic matter. It is subject to constant structural and functional change. In contrast, inorganic matter in all its forms tends towards a fixed end point and remains there. Biological systems largely correspond to dynamic nonlinear systems. According to the methods of *E. Ott, C. Grebogi* and *J. Yorke*, it can be deduced that the potential possibility of a system behaving chaotically can be an advantage. The method states that through targeted perturbation of a control parameter, different periotic movements can be controlled and stabilized, so that in principle one and the same system can be designed for different tasks [2]. Accordingly, one can assume that systems in living nature use these regulatory mechanisms in order to be able to react flexibly to changes in external conditions.

Back to the earth-like conditions. The processes by which energetic regulations changed or even formed a new compared to the first molecules are difficult to understand. One can only draw conclusions about early developments by observing the physical regulation within today's life forms. The magnetic field, with its reduced energy compared to extraterrestrial conditions and its resonance energy, plays a major role. Equally important is electromagnetic radiation, within which UV radiation appears to have a special significance. Its influence on the function of the electrons, measured by the behavior of the spin, is significant. The energy transfer by photons to the electrons of the molecules changes the angular momentum of the electrons and thus the spin, a change that in turn leads to changed magnetic properties. Thus, the electrons and their electron configuration are of fundamental importance. Within the framework of the shell model of the atomic shell, the electron configuration indicates the distribution of the individual electrons across different energy states. Due to its electron configuration of the half-filled shells, the carbon atom has the ability to form complex molecules and is capable of allotropic phase transitions and chain formation. Carbon is therefore one of the most important elements with regard to the development of higher-level life forms. It can form long chains that both close cyclically and form branches. This is the basis for the formation of millions of compounds.

As already explained, early organic molecules are formed into conglomerates by the omnipresent kinetic energy. These conglomerates grew into higher structured molecules on earth. Biochemical systems developed which ultimately formed into autocatalytic systems. The influence of kinetic energy in chaos is fundamental. In nature there is a regulated exchange of energy, matter and information. Their interaction is the basis for maintaining a greater order within a common system.

As already mentioned, a prerequisite for the development of organic life forms is water. To explain this, we need to mention the special properties of hydrogen atoms. The general properties and regulation options relate to its electron negativity, the magnetic behavior as a diamagnetic substance and the reaction options based on the Van der Waals radii, the covalent radius and the ionization energy. From this, the structural properties of water are important, described by Pollack [4], which lead to different energetic and functional performances. One example is the physiological observations of plants [1].

All in all, it is clear that over the course of time from the middle of the 20th century to the present day, scientific findings have been developed that, although they still do not allow for complete

statements, show more and more clearly that the system of the origin of life on earth requires a merging of the most diverse theoretical ideas from physics and its various specializations and chaos research to produce ever more fundamental findings. The result is the formation of high-molecular compounds, the formation of structured organic matter and the development of functional regulatory mechanisms. This sequence could be summed up with a bon mot: "Sometimes you just have to shake the chaos a little and a miracle will emerge".

Conclusion

It takes a certain philosophical way of thinking to correspond to the mechanistic view of the interpretation of life processes. But the laws of nature are clear. Their interrelationships in the clarification of processes are far from always complete. The system of "life" in all its interrelationships still requires a lot of interdisciplinary scientific work to be clarified. And interdisciplinary communication is a solid basis for this. The highly specific and theoretical research results of the individual disciplines need to be brought together. The emergence of life forms up to life as we define it today is a complex process of interwoven regulations. In this sense, one can assume that life forms, whatever their external form, exist in space. The fundamental laws of nature and their interrelationships have a deeper basis than we believe today.

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