

# Informational Analytical Representations of the Magneto-Electrochemical Theory of Life and Health

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## ABSTRACT

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The results of a theoretical study related to the role of the electromagnetic field in the process of realizing the phenomenon of life are presented. The aim of the theoretical study was to conceptualize a system of views on the role of internal electromagnetic fields in the human body for understanding the essence of the course of metabolism, the phenomena of biological life and health. General scientific and theoretical methods were used in this theoretical study. The main conclusions of the theoretical study were made as follows: 1. The life of a biological system is a process of magnetoelectric activation of its biomolecules, which starts and ensures their biochemical activity (coherent energy channeling - biochemical soliton flow) and determines structural integrity in their collective interaction of a single organism (transportation of solitons by water-energized structures - controlling soliton flow). 2. Modern deepening of fundamental knowledge to the level of the course of magnetoelectric processes at the molecular level in living biological systems is expedient to be fully integrated into medical science with a change of the electrochemical paradigm of metabolism to a magneto-electrochemical one. 3. Knowledge and understanding of quantum-mechanical features of biopolymers' functions in living systems, the understanding of their energy functioning, the organization of form and role of electromagnetic components is clearly the next step to deepen the fundamental knowledge of pathogenesis of diseases related to internal organs with a further approach to optimize their treatment and prevention.

## KEYWORDS

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Magneto-electrochemical theory of metabolism, cell membrane, electromagnetic field, the phenomenon of life, complex medicine

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## 1. Introduction

Understanding the essence of biological life is one of the main unsolved questions of fundamental science. What exactly are the mechanisms and processes that make the molecules of our body alive? How exactly and at the expense of what is this happening? The answers to these questions can allow modern medical science to significantly advance, as they could discover the latest mechanisms of influence on the tissues of the human body in order to prolong their viability and the life of a person as a whole. Science of the 21st century has improved significantly. The latest knowledge about the organization and principles of functioning of living matter at the subatomic, atomic, molecular and cellular levels is now available. It is now clear that everything that happens in tissue cells is related to their metabolic processes. It has been proven that all metabolic processes are the result of magnetoelectric interaction between atoms and molecules. That is, molecular chemistry is a secondary consequence of electromagnetism. Accumulation of the results of scientific research in this field led to a greater understanding of the role and place of electromagnetic phenomena in the organization and functioning of living biological systems, including the human body. Today, the fact of the presence of an electromagnetic component in the human body is an indisputable truth, and determination of electromagnetic parameters of the human body is already widely used for diagnostic purposes in medicine. Mankind has practically investigated the nano-level structure of matter at the current stage of scientific development, and it has come to an understanding of the organizational field of the structure of matter. The scientific opportunity for the further development of medicine has been formed now thanks to the possibility of transdisciplinary implementation of the latest fundamental scientific knowledge. However, there are no generalizing theoretical works in this direction in medicine.<sup>1-6</sup>

Therefore, the aim of this theoretical study was to conceptualize a system of views on the role of internal electromagnetic fields in the human body for understanding the essence of the course of metabolism, the phenomena of biological life and health.

## 2. Methodology

The analysis of the presented data is a fragment of research work of the Department of Internal Medicine and Emergency Medicine of Poltava State Medical University (23, Shevchenko St., 36011, Poltava, Ukraine) on "Development of algorithms and technologies for implementing a Healthy Lifestyle in patients with Non-communicable Diseases (NCDs) based on the study of functional status" (state registration number 0121U108237: UDC 613 616-056-06: 616.1 / 9-03).

Scientific work is carried out in conjunction with the following scientific institutions: 1) Poltava State Medical University (23, Shevchenko St., 36011, Poltava, Ukraine), the cooperation coordinator is the Head of the Department of Internal Medicine and Emergency Medicine, prof., DM M.M. Potiazhenko; 2) Shupyk National Healthcare University of Ukraine (9, Dorogozhytska St., 04112, Kyiv, Ukraine), the cooperation coordinator is the Head of the Department of Informatics, Information Technologies and Transdisciplinary Education, prof., DM O. P. Mintser 3) Lithuanian University of Health Sciences (9, A. Mickevičius St., LT-44307, Kaunas, Lithuania), the cooperation coordinator is the Head of the Nephrology Department, Prof., DM I.A. Bumblyte.

General scientific methods (dismemberment and integration of elements of the studied system, imaginary experiment, logical, historical research, analysis, induction, deduction, and synthesis of knowledge) and theoretical methods (method of constructing theory, logical methods, and rules of normative nature) were used in this theoretical study.

### 3. Results and discussion

Performing a systemic medical analysis provided the basis for the main concepts that were formulated in postulates.<sup>2,7,8</sup> The fundamentality of principles of the structure of the matter of macrocosm became the basis for the formulation of the following conceptual conclusions of electromagnetic phenomenology of metabolism of living biological systems, including the human body:

- All living biological systems, including the human body, at the atomic level have an electromagnetic nature of their structure and consist of field structures – fermions, which are united by the field forces of electromagnetic, strong, and weak nuclear interactions, the carriers of which are bosons;
- All living biological systems, including the human body, have inherent properties of wave-particle duality, which determines the presence of wave characteristics in their structure;
- All chemical reactions that take place in living biological systems, including the human body, have an electromagnetic nature and are the result of the manifestation of electromagnetic interactions of substances in them and are the result of the manifestation of electromagnetism;
- All living biological systems, including the human body, can be considered at the micro level of their structure as a form of fundamentally organized energy, which has total energy characteristics of the particles of the microcosm that form them, because the particles (quarks, antiquarks, etc.) that make up an atom are inherently energy.

The systematic analysis of modern fundamental knowledge about the molecular level of the structure of matter became the basis of the following postulates:

1. A molecule is a material manifestation of matter and a fundamental structural and functional component of micro-level organization of a living biological system of any level of complexity, including the human body; a molecule consists of atoms that are complexes of field structures.
2. Atoms are connected in a molecule by electromagnetic wave fields, the source of which are the atoms themselves, which took part in chemical interaction and self-organization of this molecule.
3. The chemical bond between atoms in a molecule is a result of the interaction of electromagnetic wave fields of atoms and it can be covalent (with the generalization of electrons) or polar (with the transition of electrons).
4. Any molecule can be represented as a model of electromagnetic wave packets, in the nodes of which there are atoms that are the source of wave generation; at the same time, electromagnetic wave packets are the result from radiation interference of all atoms of molecules of a biological system.
5. The geometry of molecules is determined by quantum mechanical characteristics of the atoms that make them up and corresponds to the minimum total energy in the ground state and, accordingly, the maximum total energy of all chemical bonds of this molecule.
6. A real molecule consists of resonating electromagnetic wave field structures (according to the principle of superposition of Dirac states), that is, it does not have a specific structure, but is formed exclusively as a result of continuous resonance – the electromagnetic superimposition of many different atomic structures.
7. A molecule has energy characteristics, which are determined by electromagnetic characteristics of the atoms forming it and contain the energy of electron rotation, the energy of oscillation and

rotation of the nuclei of each atom forming it with a different contribution of each type of energy to the total energy of the molecule; at the same time, each energy component is quantized.

8. A molecule can be in the ground state or in an excited electronic state, which is classified depending on the total spin of the molecule and is subject to the rules of electronic transitions that have different probabilities.
9. Molecules of biological systems have individual quantum mechanical features due to the special composition of atoms (carbon (C), hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P), sulfur (S)), the biopolymer structure of most molecules, with a significant molecular mass and length of molecules, and have different variants of possible states of structural organization in space.
10. The state of an electron in a molecule is described using a wave model based on the Schrödinger equation, which is called a molecular orbital and includes localized  $\sigma$ -orbitals, localized and delocalized  $\pi$ -orbitals, and n-orbitals; at the same time, there are significant difficulties in their adequate calculation, since when accounting for interelectron repulsion there are no opportunities to separate variables in any coordinate system, this necessitates the use of approximate methods in determining the shape of molecular orbitals (scientific representations of the shape of molecules are relatively conventional).
11. The principal quantum-mechanical difference between the functioning of polymer biomolecules of living systems and the molecules of inanimate matter is their ability to transform unorganized (thermal, chemical, etc.) energy into a coherent form and its intermolecular transfer due to the system of delocalized  $\pi$ -electrons (quantum - Millikan mechanical model).
12. Delocalization of  $\pi$ -electrons in the molecular systems of living organisms is an important and fundamental quantum-mechanical feature of energy circulation in the universe (including the model of the "electronic circuit of life") and the phenomenon of biological life; all of the most important biomolecules are partially or fully connected systems precisely because of this.
13. Each of two or more autonomous  $\pi$ -electron systems of a living biological molecule can exhibit spectral independence and simultaneously interact with other molecules; at the same time, the interaction of  $\pi$ -electron systems inside the molecule is caused by energy migration along it, that is, energy transfer between different functional groups of this molecule, which is considered as a quantum mechanical feature of intramolecular and intermolecular transfer of energy and charge.
14. The ability to intramolecular and intermolecular transfer of energy and charge is determined by the inherent quantum mechanical features of the structure of biopolymers of living biological systems and turns out to be their fundamental distinctive property.
15. Energy conversion processes in the molecules of living biological systems are accompanied by the phenomenon of photon/electron emission, which is determined by various mechanisms of occurrence (with stimulation, this is secondary luminescence/photon emission; without stimulation, this is intrinsic luminescence/photon emission, etc.); it is a special case of energy transfer, has distinctive features in various cell ultrastructures (respectively in various tissues, organs, body parts); it is the most characteristic of molecular structures that contain complex proteins with chromophore coenzyme groups.
16. The fundamental difference of living biological systems is the presence of deterministic self-organization of their molecules through the implementation of information-energy processes of intramolecular and intermolecular energy transfer due to the excitonophonic/soliton mechanism of conversion of ATP chemical energy by biopolymers into coherent energy with further transmission in the form of a soliton/biosoliton/electrosoliton along the chain biopolymer.

17. The soliton mechanism of energy transfer along the chain of biopolymers is the electromagnetic basis of the phenomenon of the life of living biological systems; all biopolymers of a living organism with enharmonic atomic groups convert chemical (perhaps of another kind) energy that excites their oscillations into coherent energy/solitons, which are further transported along the chains of the biopolymer, ensuring its chemical interactions and mechanical movement.
18. The organismic universality of the energy-carrying molecule ATP and the consistency of the interactions between completely different biopolymers in living biological systems are the result of the constant impact of coherent energy on the structured water environment of a biological organism.
19. Water in living biological systems plays a key role in the process of transmitting and receiving coherent soliton energy by self-organizing into fractal energy-stressed paramagnetic crystal structures that form multi-level branched, long-lasting fractal complexes connected to biopolymers, the existence of which is supported by coherent energy flows/solitons.
20. Helix 30/11 is the main most typical fragmentary element of self-organization of water into fractal structures, which in living biological systems forms energy-stressed fractal crystalline thread-like water structures, supported by energy constantly supplied by biopolymers, and forms large ever-growing hierarchical structures that combine all of the water of a living organism in a dynamic balance of opposite processes of destruction and growth of its energy-stressed crystalline structures.
21. The framework structure of the water helix 30/11 is an empty tube with an inner diameter of 3.2 nm, created by oxygen atoms; protons cover its inner and outer surfaces, and this leads to the presence of pronounced paramagnetic properties of water and can explain the mechanism of the occurrence of internal tension in the crystal lattice of energy-stressed water crystals of living biological systems and the effect on their orientation, on the transport of solitons of the Earth's external magnetic field.
22. The phenomenon of biological life at the micro level is characterized by the presence of a state of connectedness/organization of water into energy-stressed crystal structures due to the constant supply of coherent energy from biopolymers and stops when this energy flow disappears, which corresponds to the onset of the phenomenon of biological death and is manifested by the degradation of energy-stressed fractal crystal self-organization of water to the unbound state of an aqueous solution devoid of so-called biological anomalies (the theory of collective processes of Hall).
23. Bioenergetics processes at the molecular level of living biological systems are completely determined by the flow of magnetoelectric processes and include the following stages:
  - transformation of the chemical energy of ATP into a coherent form – a soliton;
  - channelization of the generated coherent energy (solitons) along the biopolymer chain to ensure its biochemical and mechanical activity;
  - transport of coherent energy (solitons) to the surrounding polarized environment of water with its subsequent structuring, formation of crystalline hierarchical water systems that perform the function of remote non-chemical energy transfer (remote energy-information communication) to remote biopolymers to ensure the possibility of implementing collective processes between biopolymers of all living organisms system (human organism) (the theory of collective processes of Hall);
  - the selectivity of the contact between biopolymers in the process of implementing energy-informational soliton communication is determined exclusively by magnetoelectric phenomenology based on the principle of resonance-frequency interaction between molecules;
  - a fundamental difference in the behavior of biopolymers in vivo of a normally functioning/healthy

biological system is their ability to collectively interact with the formation of a conditional unit – a molecular cell, which possesses the qualities of a life phenomenon, unlike biopolymers in an in-vitro solution.

24. A molecular cell is a new substantial formation that contains two or more biopolymer-aqueous structures, the collective processes of excitation which are associated with the perception, transformation and transportation of energy, create a long-range information-controlling interaction of biopolymers in resonance processes, which turns out to be specific property and sign of living matter; is a new conditional "transitional" unit of life evolution of a biological substance on Earth, which has applied significance for the formalization of bioenergetics processes in living systems.
25. The phenomenon of biological life is completely determined by magnetoelectric processes at the molecular level: absent energy processes – absent life.
26. The phenomenon of biological death at the molecular level has a quantum-mechanical description, caused by a change in the energy characteristics of the atoms of molecules due to the cessation of energy movement, and has a number of objective manifestations; the main and primary manifestation is the disintegration of energy-stressed water crystal structures with the subsequent phenomena of the disappearance of the energy-information connection between biopolymers, after which biological disintegration begins.

All this demonstrates that the structure and functioning of the molecular level of the organization of living biological systems of various levels of complexity, including the human body, is determined and implemented due to the course of magnetoelectric processes. The initial quantum mechanical features of substances determine the subsequent magnetic and electrostatic qualities of tissue molecules, and the chemistry of biological molecules is a secondary property that is derived from their magnetoelectric and energy parameters, since:

- All living biological systems, including the human body, have an electromagnetic nature of structure, consist of resonating electromagnetic wave field structures-oscillators and are united by electromagnetic field interactions;
- All living biological systems, including the human body, exhibit the properties of wave-particle duality and can be modeled at the molecular level in the form of resulting interfering electromagnetic wave packets, in the nodes of which there are atoms that are a source of wave generation, which causes the presence of wave characteristics of structures at the macro level of organizations;
- All chemical reactions that occur in living biological systems, including the human body, have an electromagnetic nature and are the result of the manifestation of field and electromagnetic interactions of substances in them;
- Since the atoms that form molecules are essentially energy, all living biological systems, including the human body, can be considered at the micro level of their structure as a form of fundamentally organized energy, which is characterized by the total energy characteristics of the components of the microcosm that form it;
- The phenomenon of life at the molecular level is due to the constant course of electromagnetic processes that ensure the structural and functional integrity of a living biological system, and which cease with the onset of its death;
- Water is a mandatory component of ensuring the life of a biological system, as it creates conditions for non-chemical information-energy cooperation of biological molecules of the body.

Thus, the primacy of magnetoelectric interaction at the molecular level is the root cause of the existence

and adequate functioning of living biological systems of various levels of complexity, including the human body, since the vital activity and functioning of living biological systems in the corridor of the physiological norm (called health) is completely determined by the magnetoelectric support of the molecules of its organism according to the participation of energetically changed water environment. It is important to note that, based on these positions, life and health acquire new characteristics of their conceptual apparatus, since they should be described as the state of having adequate (which exactly – to be specified in the future) levels of magnetoelectric energy processes between biomolecules, which objectively manifested at the macro level by the normal level of metabolism, functioning of tissues and organs of the human body according to the magneto-electrochemical theory. Accordingly, it is logical to consider the disease as a disorder of the magnetoelectric state of biomolecular structures, and death is their complete absence, and the human body is one of the forms of the magneto-electrochemical organization of biological matter on Earth.

This radically deepens the understanding of the structure, organization, and functioning of the human body, fundamentally changes the nature of the interpretation of biological processes that occur in the human body in normal and pathological conditions, expands the possibilities of in-depth study and description of the pathogenesis of diseases of the human body, and demonstrates the need for a paradigmatic transition from the electrochemical concept of exchange substances to magneto-electrochemical.

The magneto-electrochemical theory of metabolism is of great importance for the theoretical branches of medicine. Life can be understood as an electro-magneto-biochemical process in which information is exchanged. And this process is disrupted when a disease occurs, or even a disease is the result of a violation of these processes. Therefore, it is important to continue theoretical studies of the pathogenesis of diseases at the quantum level. It is important to integrate the results obtained into the relevant theoretical branches of medicine.

#### 4. Conclusions

The life of a biological system is a process of magnetoelectric activation of its biomolecules, which starts and ensures their biochemical activity (coherent energy channeling – biochemical soliton flow) and determines structural integrity in their collective interaction of a single organism (transportation of soliton by water-energized structures – controlling soliton flow).

Modern deepening of fundamental knowledge to the level of the course of magnetoelectric processes at the molecular level in living biological systems is expedient to be fully integrated into medical science with a change of the electrochemical paradigm of metabolism to a magneto-electrochemical one. This is necessary because a true understanding of the etiology of diseases of internal organs/NCDs requires a clear and correct understanding of what actually happens to the biopolymers of the human body at the molecular level, what transformations occur with them under different conditions and under the influence of various factors of the internal environment, which are determined by the style human life (nature of nutrition, level of physical activity, etc.).

Knowledge and understanding of the quantum-mechanical features of the functioning of biopolymers in living systems, the understanding of the essence of their energy functioning, the organization of the form and role of electromagnetic components is clearly the next step to deepening the fundamental knowledge of the pathogenesis of diseases of internal organs with a further approach to optimize their treatment and prevention.

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### Conflict of interest

The author has no conflict of interest to declare.

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### References and notes

- [1] Mintser O.P., Zalisky V.M. Sistemnaya biome-ditsina. Tom 1. Kontseptualizatsiya [System biomedicine. T.1: Conceptualization], Kiev: Interservis, 2019. 549 p. (Ukrainian)
- [2] Mintser O.P., Potyazhenko M.M., Nevoit G.V. Mahnitoelektrokhimichna teoriya obminu rehovyn. Tom 1. Kontseptualizatsiya [Magnetochemical Theory of Metabolism. Volume 1 Conceptualization]: monograph. in 2 volumes Kyiv-Poltava, Interservice, 2021, 352 p. URL: [http://repository.pdmu.edu.ua/bitstream/123456789/16848/1/MagnitoElectro-ChemicalTheoria\\_T1.pdf](http://repository.pdmu.edu.ua/bitstream/123456789/16848/1/MagnitoElectro-ChemicalTheoria_T1.pdf) (Ukrainian) Accessed July 30, 2022
- [3] Mintser OP, Potiazhenko MM, Nevoit GV Evaluation of the human bioelectromagnetic field in medicine: the development of methodology and prospects are at the present scientific stage. *Wiadomości Lekarskie*. 2019; 5, (II): 1117-1121. doi:10.36740/WLek201905231
- [4] Potiazhenko MM, Nevoit GV. Neinfektsionnyye zabolevaniya: poisk al'ternativnykh resheniy problemy s biofizicheskikh pozitsiy [Non-communicable diseases: finding alternative solutions to the problem from a biophysical perspective]. *Praktikuyuchiy likar*, 2019; 1:57-62. URL: <https://plr.com.ua/index.php/journal/article/view/274/235> (Russian)
- [5] Potiazhenko MM, Nevoit GV. Innovacijni metodiki ob'ektivnogo obstezhennya z komp'yuternim testuvannjam v evolyucii registracii fizichnih fenomeniv likarem terapevtichnogo profilju: istoriya, real'nist', perspektivi [Innovative methods objective examination with computer testing are in the evolution of the registration of physical phenomena by a therapeutic profile doctor: history, reality, perspectives]. *Medical Informatics and Engineering*, 2018; 4: 58-65. doi: 10.11603/mie.1996-1960.2018.4.9894 (Russian)
- [6] Mintser OP, Semenets VV, Potiazhenko MM, Podpruzhnykov PM, Nevoit GV. The study of the electromagnetic component of the human body as a diagnostic indicator in the examination of patients with Non-communicable diseases: problem statement. *Wiadomości Lekarskie*. 2020; 6 (73): 1279-1283. doi:10.36740/WLek202006139
- [7] Nevoit GV. Mahnitoelektrokhimichna kontseptsiya obminu rehovyn: postulaty i osnovni vysnovky. Chastyna 1 [Magnetochemical concept of metabolism: postulates and main conclusions. Part 1]. *Current Issues of Modern Medicine: Bulletin of the Ukrainian Medical Dental Academy*. 2021; 1(21): 203-209. doi:10.31718/2077-1096.21.1.203. (Ukrainian)
- [8] Nevoit GV. Mahnitoelektrokhimichna kontseptsiya obminu rehovyn: postulaty i osnovni vysnovky. Chastyna 2 [Magnetochemical concept of metabolism: postulates and main conclusions. Part 2]. *Current Issues of Modern Medicine: Bulletin of the Ukrainian Medical Dental Academy*. 2021; 2 (21): 229-233. doi:10.31718/2077-1096.21.1.203 (Ukrainian)