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**MAGNETOELECTROCHEMICAL THEORY OF METABOLISM AND LIFE:
WHAT IS IT, WHEN IS IT NEEDED AND WHAT TO EXPECT FROM IT FOR MEDICINE
AND REFLEXOLOGY (LITERATURE REVIEW)**

Actuality. This review presents the ideas of the magnetoelectrochemical theory of metabolism and life as a new paradigm of views on the fundamentals of the functioning of the human body at the nanolevel and deeper (<1nm). The authors justify the need to recognize the latest knowledge for the further progress of medicine. The article describes the prospective significance of the magnetoelectrochemical theory of metabolism for pharmacology, microbiology, internal medicine, psychiatry, surgery, and reflexology.

The aim of this study is to substantiate the paradigm-transforming value of the magnetoelectrochemical theory of metabolism and life for medicine and reflexology.

Materials and methods: general scientific and theoretical methods were used during the theoretical research.

Research results. The paradigm-transforming value of the magnetoelectrochemical theory of metabolism and life for reflexology and medicine, in particular for pharmacology, microbiology, internal diseases, psychiatry, and surgery, was substantiated.

Conclusion. *The magnetochemical theory of metabolism and life is a concept of modern scientific knowledge with great paradigm-transforming potential and important significance for fundamental medicine. It is a scientifically based basis for the further development of medicine and its branches: quantum pharmacology, quantum microbiology, bioelectronic medicine, etc., and a promising direction for the continuation of scientific research.*

Key words: *magnetochemical theory of metabolism, quantum pharmacotherapy, quantum microbiology, bioelectronic medicine, traditional medicine, reflexology.*

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МАГНІТОЕЛЕКТРОХІМІЧНА ТЕОРІЯ МЕТАБОЛІЗМУ Й ЖИТТЯ: ЩО ЦЕ ТАКЕ, КОЛИ ВОНА ПОТРІБНА ТА ЧОГО ВІД НЕЇ ОЧІКУВАТИ ДЛЯ МЕДИЦИНИ Й РЕФЛЕКСОТЕРАПІЇ (ОГЛЯД ЛІТЕРАТУРИ)

Актуальність. *Зазначений огляд презентує ідеї магнітоелектрохімічної теорії метаболізму й життя як нової парадигми поглядів на основи функціонування тіла людини на нанорівні та глибше (<1нм). Автори обґрунтовують необхідність*

визнання новітніх знань задля подальшого прогресу медицини. У статті викладено перспективне значення магнітоелектрохімічної теорії метаболізму для фармакології, мікробіології, внутрішніх хвороб, психіатрії, хірургії та рефлексотерапії.

Мета дослідження – обґрунтувати парадигмально-трансформувальне значення магнітоелектрохімічної теорії метаболізму й життя для медицини та рефлексотерапії.

Матеріал і методи. Під час виконання теоретичного дослідження використано загальнонаукові й теоретичні методи.

Результати дослідження. Обґрунтовано парадигмально-трансформувальне значення магнітоелектрохімічної теорії метаболізму й життя для рефлексотерапії та медицини, зокрема для фармакології, мікробіології, внутрішніх хвороб, психіатрії, хірургії.

Висновки. Магнітоелектрохімічна теорія метаболізму й життя є концептом сучасних наукових знань із великим парадигмально-трансформувальним потенціалом і вагомим значенням для фундаментальної медицини, є науково обґрунтованою базою для подальшого розвитку медицини та її розділів: квантової фармакології, квантової мікробіології, біоелектронної медицини тощо, перспективним напрямом продовження наукових досліджень.

Ключові слова: магнітоелектрохімічна теорія метаболізму, квантова фармакотерапія, квантова мікробіологія, біоелектронна медицина, традиційна медицина, рефлексотерапія.

Introduction. Medicine is a transdisciplinary branch of science that develops based on the progress of fundamental sciences. The last fifty years have seen significant developments in physics. It was understood that atoms at the nanoscale and deeper (<1 nm) are conglomerates of electromagnetic fields, that all matter is formed by energy and therefore has frequency and wave characteristics simultaneously (Hübsch, 2023; Filyunova, et al., 2023; Nevoit, et al., 2023, pp. 49–66; Peacock, 2008; Nowak, 2017). The Standard Model of Particle Physics was developed (Wells, 2020; Paganini, 2023; Gaillard, et al., 1999; Chauhan, et al., 2007). Quantum physics arose and received significant development. Other quantum fields of science soon emerged: quantum chemistry (Cao, et al., 2019; Gupta, 2016), bioelectronic chemistry (Fang, et al., 2020), quantum biology (Marais, et al., 2018; Boyko & Krasnogolovets, 2003; Gibney, et al., 2021; Binhi & Rubin, 2022; Yamanouchi, 2016; Kenneth, 2014.; Davies, 2004). Views on the structure of matter have fundamentally changed and therefore medicine must also change (Mintser, Potyazhenko, & Nevoit, 2019; Mehra, 2021).

Now all sections of medicine can be expanded and supplemented with a description of aspects of the quantum level of processes (Sindhvani, & Chan, 2021; Gibney, et al., 2021; Nevoit, et al., 2023, pp. 49–66). Now medicine operates with ideas at the level of molecules and studies the chemical interactions between them. Therefore, the electrochemical paradigm of metabolism of substances in the human body is still dominant among a large number of modern scientists. However, the electrochemical paradigm of metabolism in the human body is already fundamentally outdated. This is so because chemistry is a secondary phenomenon of electromagnetism and all chemical reactions are determined by the energy state of atoms and their quantum mechanical characteristics. Biomagnetism is an integral fundamental component of biological processes in living organisms (Malmivuo, & Plonsey, 1995; Mintser, Potyazhenko, & Nevoit, 2019, p. 1117–1121).

Biomagnetism predetermines metabolic processes, regulates their course and simultaneous coordination in the human body. That is why at the present stage of development of science, the electrochemical paradigm of metabolism of substances in the human body must be changed to the magneto-electrochemical paradigm of metabolism of metabolism.

For the further development of medicine, in 2019, research work began on the biomedical conceptualization of the magneto-electrochemical theory of metabolism and life of the human body (Mintser, et al., 2020, p. 1279–1283; Mintser, Potyazhenko, & Nevoit, 2019, 2021). This was a fragment of an initiative research work on the topic and technologies for implementing a Healthy Lifestyle in patients with Noncommunicable Diseases (NCDs) based on the study of functional status (state registration number 0121U108237: UDC 613 616-056-06: 616.1/9-03). This scientific research is currently ongoing. Its final stage is the educational, scientific, research project “Bioelectronic medicine or look at medicine differently”. The implementation of this fragment involves scientists from the Poltava State Medical University (coordinator Prof. M. Potyazhenko), scientists from the Shupyk National Healthcare University of Ukraine (coordinator Prof. O. Mintser), scientists from the Lithuanian University of Health Sciences (coordinators Prof. I.A. Bumblyte and Prof. A. Vainoras) according to the concluded memoranda of scientific cooperation. Scientists from Bulgaria (Prof. I. Ignatov) and doctors of scholastic medicine from Ukraine (Preventive Medicine Center of Genesis Center LLC) and Lithuania also take the initiative. The purpose of the project is to promote the development of scientific ideas of quantum medicine/bioelectronic medicine based on combining existing knowledge of orthodox medicine and traditional medicine with modern biophysical knowledge about the functioning of the human body to solve the problem of NCDs, etc. Therefore, the purpose of this scientific review is to justify the feasibility of further development of the field

of quantum medicine /bioelectronic medicine based on the introduction of the magnetochemical theory of metabolism and life into various branches of medicine.

Electromagnetic processes are the basis of the phenomenon of life of the human body. “Electromagnetism is the basis of life itself” (Hawking, 1995) and this is already an indisputable scientific fact. This is so because at the subatomic level, atoms are formed by electromagnetic field patterns/energy (fig. 1) (Nevoit, et al., 2023, p. 49–66).

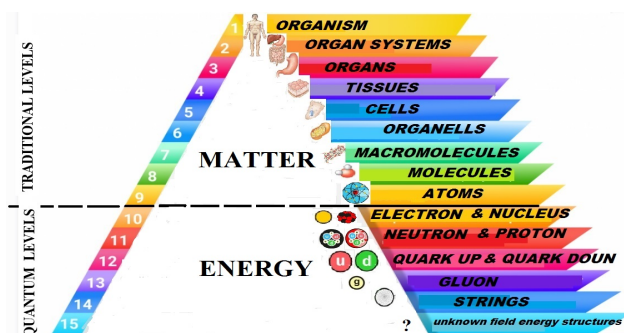


Fig. 1. Graphic representation of the structural levels of organization of the human body, taking into account modern fundamental biophysical knowledge (Nevoit, et al., 2023, p. 49–66)

To date, work on the conceptualization of the magnetochemical theory of metabolism (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023) continues. The phenomenology of the life of the human body is completely determined by electromagnetic processes at all structural levels of its hierarchical organization (fig. 2).

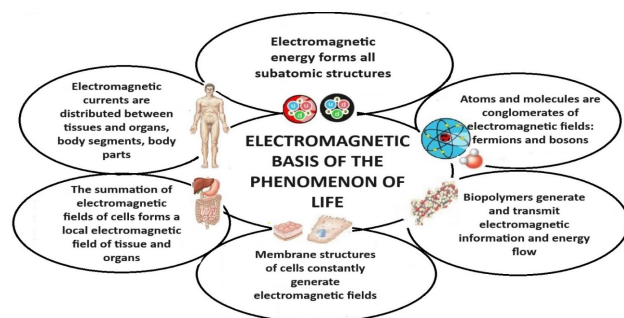


Fig. 2. Participation of electromagnetic processes in the implementation of the phenomenon of life at all structural levels of the human body

At the nanoscale and deeper (<1nm), electromagnetic energy in the form of field energy structures forms atoms of matter (Figure 2) (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023). According to modern scientific concepts, these electromagnetic

field structures are classified into fermions and bosons. The electromagnetic mechanisms of matter formation are justified by the standard model of atomic structure (Wells, 2020; Paganini, 2023; Gaillard, et al., 1999; Chauhan et al., 2007) and the laws of quantum physics (Hübsch, 2023; Filyunova, et al., 2023; Nevoit, et al., 2023, pp. 49–66; Peacock, 2008; Nowak, 2017).

At the atomic and molecular levels of the structure of matter, electromagnetic energy determines all the physical and chemical properties of atoms and molecules throughout their participation in the metabolism of substances in all processes on planet Earth and in the human body. All chemical reactions are determined by the electromagnetic parameters of atoms and occur as a result of energy exchange. Chemistry is a secondary phenomenon of electromagnetism (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023).

At the same time, in living biological organisms, electromagnetic energy makes biopolymers/chains of molecules alive. This is so because the biopolymer *in vivo* is in the environment of the electromagnetic field of a living organism and constantly receives a flow of electromagnetic energy (biochemical and informational electromagnetic signaling) from other biopolymers and through the liquid media of the body (for example, through energy-intensive liquid crystalline water structures (Nevoit, et al., 2022, p. 45–57), etc.). Placing a biopolymer molecule *in vitro* conditions interrupts the flow of this electromagnetic energy. This leads to the loss of many qualitative properties that the biopolymer had in a living organism, and it ceases to be in fact “alive”. Electromagnetic energy determines not only the structural organization of a substance, influencing the formation of its molecular lattice, but *in vivo* it is also of key importance in the formation of total electromagnetic fields, which determine the morphogenesis of tissues and the correct rapid occurrence of metabolic processes (for example, protein folding, etc.) (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023).

The electromagnetic processes at the cellular level of the human body structure are determined and manifested by the processes of generating an electromagnetic field by the membrane structures of cells (Nevoit, et al., 2022, p. 22–34).

Essentially, from a physical point of view, membranes can be considered as capacitors that generate and accumulate electrical potential. The life of a cell is completely determined by the electromagnetic processes of its membrane structures: there are no electromagnetic processes and there will be no life (Mintser, Potyazhenko, & Nevoit, 2021; Mintser,

Potyazhenko, & Nevoit, 2023). *In vivo* in a cell, a key role in ensuring electromagnetic processes is assigned to unique membrane structures mitochondria (San-Millán, 2023; Chen, et al., 2023). Electromagnetic processes in the inner membrane of mitochondria provide tissue respiration in the tricarboxylic acid cycle, which is a key electromagnetochemical process in ensuring the phenomenon of cell life. Mitochondrial membranes have unique quantum mechanical features of their structure, which allow them to participate in a large number of fundamentally important metabolic processes, as well as in electromagnetic signaling (Luis, et al., 2022; Mintser, et al., 2022, p. 67–74; Hyatt, & Powers, 2021).

Electromagnetic processes are involved in the functioning of deoxyribonucleic acid (DNA) molecules. There is a scientific opinion that cell DNA molecules accumulate biophotons and are the source of biophoton emission. DNA has an information density that is $1 \cdot 10^9$ higher than that of any technical solution known to date. The high density of information in DNA leads to the phenomenon of Bose-Einstein condensate and causes the capture and storage of photons. The photon energy accumulated in DNA ensures the stability of the molecule. An electromagnetic coherent cellular biological state is established in DNA in the form of a Bose-Einstein condensate: photons of the same frequency and phase are aligned with each other. It turns out that 97.98% of inactive DNA is responsible for organizing 2.02% of genetically expressed DNA. DNA also transmits genetic information in the form of electromagnetic radiation – the emission of biophotons. It has been proven that DNA generates biophotons (Vodyanoy, et al., 2015), which carry genetic information further in the cell. It has been established that DNA molecules in a cell are the source of 75% of biophotons (Yip, & Madl, 2006; Popp, 2005; Bischof, 2008; Nevoit, et al., 2023, p. 1–15). Thus, DNA transmits information in the form of electromagnetic energy in the form of biophotons into streams of electromagnetic energy that arise on the membrane structures of the cell during the processes of their depolarization and repolarization. Thanks to this, the electromagnetic field of the cell receives an information component specific to it. The source of this information for the electromagnetic field of a cell is biophoton signaling from its DNA molecules. This is a very important fundamental aspect, the study of which continues. Physicists have proven the fact that information is converted into energy (Toybe, et al., 2010) and have proven the equivalence of energy and information (Szilard, 1929). At the same time, the fact has been established that the design of DNA strands corresponds to proven physical concepts as an energy generator that carries information (Vodyanoy, et al., 2015).

Frequency-wave processes and electromagnetic fields of individual cells merge and form the total resulting zones of electromagnetic fields of individual tissues, and then the body as a whole. The functioning of organs and organ systems is directly related and determined by electromagnetochemical aspects. The electromagnetic activity of organs has been sufficiently studied. Research on the electromagnetic activity of the brain (Gross, 2019; Rayi, & Murr, 2022; Soufneyestani, et al., 2020) and heart (Castaldo, et al., 2019; Brisinda, et al., 2023; Her, et al., 2023) has long been at the forefront of science. This was due to their importance in ensuring the life of the human body. Many scientific works have been related to the electrical activity of the digestive organs (Chen, et al., 1993; Ching, & Tan, 2012; Du, et al., 2018), urinary excretion (Kinder, et al., 1998), striated muscles (Kane & Oware, 2012), vision and hearing (Galldiks & Haupt, 2008; Shimura, et al., 2023; Rüschemschmidt, et al., 2022). A large layer of scientific research has been devoted to research into the electromagnetic properties of skin (Birgersson, 2012; Yang et al., 2022; Zhang et al., 2022). Today it is absolutely clear that from a biophysical perspective, life is “a process of magnetoelectric activation of biomolecules, which triggers and ensures their biochemical activity and ensures structural integrity in the collective interaction of molecules of the whole organism (Mintser, Potyazhenko & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023). Life can be defined as “a mode of electromagnetic existence of protein bodies”. Therefore, the phenomena of life and health should now be described as a state of presence of adequate (which ones will have to be specified in the future) levels of the flow of magnetoelectric energy processes between biomolecules. This is objectively manifested at the macro level by the normal level of metabolism, the functioning of tissues and organs of the human body.

For a long time, the electromagnetic activity of the central and peripheral nervous systems was associated with the provision and regulation of all motor and metabolic processes at the organismal level of organization of the human body. The important role of the nervous system in coordinating functional activity and in the formation of functional connections in the body is reflected in the doctrine of dermatomes, sclerotomes, viscerotomes (Whitman, et al., 2024; Kooloos & Vorstenbosch, 2013; Keynes, 2018; Sikdar et al., 2023). However, there remain a number of significant and fundamental aspects of the functioning of the body that cannot be explained solely by the role of the nervous system in them. For example, the speed of nerve impulse transmission cannot ensure the

existing rapid metabolic response and regulation of many complex processes such as protein folding, etc. The presence on the skin of a specific system of areas of abnormally increased electrical conductivity, which persists for some time even after the death of a person, also cannot be explained from the standpoint of the exclusive role of the nervous system in the regulation of electromagnetic processes at the level of the entire body. Thus, there is a large layer of unexplained facts about the functioning of the human body, which require continued study by fundamental science and medicine. Extrapolation of the ideas of magnetochemical theory to existing fundamental knowledge can solve many complex problems and scientifically explain previously unexplained phenomena.

Magnetochemical theory of metabolism and pharmacology. Magnetochemical theory changed ideas about the human body. Now it is clear that according to the universal law of frequency-wave dualism, each component of any hierarchical level of the structure of the human body (atom, molecule, biopolymer, cell, tissue, organ, organism) can be described in the particle and wave model. Therefore, in addition to mass and size, frequency-wave physical parameters of the description are also characteristic for each component of the body structure (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023). Thus, everything has an oscillating frequency in Hertz (Hz). And this is true not only for the constituent components of the human body, but also for pharmacological drugs. Each molecule of a pharmacological drug at the subatomic level of structure is a conglomerate of electromagnetic fields and can be described in a wave model. Therefore, each atom and molecule of a pharmacological agent has its own characteristic frequency in Hz, and they form a unique specific frequency for a particular pharmacological drug. These new ideas are the basis for the further development of quantum pharmacology and the study of the features of quantum mechanical interaction of pharmacological agents with cells of the human body. The famous Ukrainian pharmacologist I. Chekaman wrote about the importance of the development of quantum pharmacology back in 2010 (Chekman, 2010).

There is also the possibility of creating bioelectronic drugs (Ganzer & Sharma, 2019). Quantum pharmacology research continues (Gadanec et al., 2023).

Magnetochemical theory of metabolism and microbiology. The adult human body consists of an average of thirty trillion cells. Moreover, of all the cells in the human body, only 43% are human cells (Rackaityte, & Lynch, 2020; Ursell, et al., 2012). The

remaining cells are foreign microorganisms that inhabit the human body as microbiota. The law of frequency-wave duality is valid for all atoms. Therefore, microorganisms also have their own characteristic frequencies in hertz. The frequency characteristics of microorganisms have already been partially studied (Sylver, 2011; Vértesi, 2004, 2010). This opens up new prospects for studying the quantum mechanical and frequency characteristics of microorganisms. Now a section of quantum microbiology can be created as well. Knowledge of the frequency parameters of microorganisms can facilitate their diagnosis because it will be possible to use *in vivo* radiofrequency diagnostic methods for this. Зная частотные параметры микроорганизмов можно производить их уничтожение *in vivo* в теле человека методом биорезонансного воздействия (Clark, 2011; Filyunova, et al., 2023). This opens up new promising ways for humanity to overcome bacterial resistance. An important scientific aspect for microbiology is the study of the mechanisms of communication of microorganisms with human cells and the role of electromagnetic signaling processes in this.

Magnetochemical theory of metabolism and internal diseases. The human body is a complex single multi-level system that functions as a single whole. The implementation of knowledge of magnetochemical theory in the section of internal diseases will provide a deeper study and understanding of the issues of intercellular electromagnetic communication. This will contribute to the understanding of exactly how organs influence each other by exchanging electromagnetic energy flows through the nervous system, through the fascial system and the role of biophotons in this (VanWijk, 2001; Popp et al., 1992; Niggli, 2014) and through the primary vascular system/energy channel system (Vodyanoy, et al., 2015; Suissa & Friedman, 2021) in the concept of traditional medicine. This will allow us to reach a qualitatively higher level of understanding of the essence of the phenomenon of NCDs comorbidity. The magnetochemical theory of metabolism and understanding of the role of magnetoelectric processes in the occurrence and progression of diseases of internal organs is the basis for creating sections of the quantum pathogenesis of disease for specific nosologies (Nevoit, et al., 2023, p. 49–66).

This will solve the medical and social problem of many NCDs, and primarily cardiovascular diseases and oncology. For example, the new hypotheses we are developing for the pathogenesis of hypertension are associated with aspects of disruption of electromagnetic biophotonic signaling at the level of the intercellular

space as a result of excessive accumulation of metabolic products and toxins. A new hypothesis for the occurrence of cancer also includes a violation of electromagnetic signaling between cells in the pathogenesis. As a result of the absence or strong weakening of local biophoton signaling from DNA, the influence of the biological field from cells with normal DNA is weakened. As a result, in the zone of weakening of the normal electromagnetic signal, atypical cells begin to develop, creating their own atypical electromagnetic field, etc. Today other scientists are thinking in this direction (Levin, 2014, 2021).

The presence of appropriate equipment and knowledge of the frequency parameters of molecules of vitamins, microelements, hormones, proteins, fats, carbohydrates, and physiological processes can allow the doctor to conduct a quick non-invasive diagnosis *in vivo* (Dörfler, 2002) during an objective examination of the patient. The study of biophotons as a parameter of the functional state of the human body and an indicator of the level of tissue metabolism is also a promising (Nevoit, et al. 2020, p. 107–111). This will simplify and increase the information content of the doctor's diagnostic work. Knowledge of the functioning frequencies of organ cells is the basis for correcting their disorders using special physiotherapeutic equipment (Brugemann, 1993; Adair, 2002.). This can be an important effective addition to complex therapy for diseases of human internal organs. There are studies on the effectiveness of frequency-wave bioresonance effects on pathologies of human internal organs (Dartsch & Heimes, 2022; Datta-Chaudhuri, et al., 2021; Kanashiro, et al., 2018; Kirsever, et al., 2022). Bioelectronic medicine is a promising direction in the treatment of diseases of internal organs (Olofsson & Tracey, 2017; Sevcencu, 2022; Singh, et al., 2022; Wild, 2003, 2009; Cherkasova, et al., 2021).

Magnetochemical theory of metabolism and psychiatry. The electrical activity and magnetic activity of the brain (Gross, 2019) are very well studied. The mental state of a person is associated with the generation of electromagnetic processes in the neurons of his brain (Buzsaki, 2011; Buzsáki & Watson, 2012). Therapeutic effects of frequencies on the brain are already used as an official therapeutic method in many countries (Basar & Bullock, 2012; Won, et al., 2020). It is important that these methods can effectively treat depression (Muresan, et al., 2021; Muresan, et al., 2022).

More complex issues for science are understanding the mechanisms of the functions of higher nervous activity in humans. It is anticipated that these issues will be resolved by using the scientific apparatus of quantum physics. The concepts of magnetochemical theory can explain the existence of psychosomatic pathologies

(Zhdan, et al., 2011), and this will contribute to the search for new possibilities for their treatment.

Magnetochemical theory of metabolism and surgery. Laser technologies are officially used in surgery many countries (Wu, et al., 2022; Gunalan & Mattos, 2023). However, knowledge of the magnetochemical theory of metabolism can be used for postoperative management of patients. Using frequency wave treatment methods, tissue repair processes in the surgical area can be accelerated and the general metabolic condition of the patient can be improved. All this can increase the survival rate of patients after surgery. This is especially important during major abdominal surgeries.

Frequency wave therapy methods can be used in complex pain treatment (Arneja, A.S., et al., 2016; Marcia & Saba, 2017; Abdulla, et al., 2019; Alzayed & Alsaadi, 2020; Barassi, et al., 2020; Trofè et al., 2023). This also increases the effectiveness of patient treatment and is a practical confirmation of the validity of the magnetochemical theory of metabolism and life.

Magnetochemical theory of metabolism and reflexology. The ideas of the magnetochemical theory of metabolism of substances in the human body are of great importance for reflexology. The fact is that the implementation of new biophysical knowledge about electromagnetic cellular signaling expands the understanding of the possibilities of intercellular communication in the human body and can explain from a scientific point of view the therapeutic effects of traditional medicine (acupuncture, homeopathy, etc.).

At the beginning of the twentieth century, the existence of a morphological substrate of the system of energy channels/meridians of the human body was finally proven, which was called the "Primary Vascular System" (Vodyanoy, et al., 2015; Suissa & Friedman, 2021). However, the integration of this new knowledge into modern science did not occur (Stefanov, 2022). This can be explained by the existence of a scientific gap between the knowledge of traditional medicine and the knowledge of orthodox medicine. In modern medical science, no medical-biological theory has not been developed that can logically explain the existence of energy meridians in the human body and fit this into the existing paradigm of ideas about the functioning of the human body. Now, thanks to the ideas of the magnetochemical theory of metabolism, the medical biological concept of biophotonic signaling is being developed. This concept combines existing medical knowledge and the ideas of traditional medicine about the existence of energy channels in the human body. Thanks to this, the scientific paradox regarding the

acceptance of scientific data about the existence of the primary vascular system in the bodies of humans and mammals will be resolved. This is very important and promising, since it will allow us to finally establish in science another new anatomical and morphofunctional system of the body – the energy system/primary vascular system (Potyazhenko & Nevoit, 2019).

Discussion. The correctness of any theory is justified by a large number of previous observations and confirmed in practice. The magnetochemical theory of metabolism and life is the sublimated result of scientific research over the past 250 years since the discovery of electricity and magnetism. Therefore, the magnetochemical theory of metabolism and life (Mintser, Potyazhenko, & Nevoit, 2021; Mintser, Potyazhenko, & Nevoit, 2023) is the result of the scientific work of many thousands of scientists over several centuries, which has been generalized at the present stage (Potyazhenko & Nevoit, 2019).

The magnetochemical theory of metabolism and life was formulated as a result of extrapolation of existing biophysical knowledge to medical knowledge about the structure and functioning of the human body. The result of this was the formulation of postulates (Nevoit, 2021, p. 203–209, 229–233; Mintser, Potyazhenko, & Nevoit, 2021; Mintser et al., 2022, p. 232–246; Mintser, Potyazhenko, & Nevoit, 2023).

The magnetochemical theory of metabolism and life has been confirmed in practice. It is consistent with all magnetic and electrical processes known to science in the human body. This theory does not contradict the existing scientific paradigm of the functioning of the human body, but only complements it, enabling science to explain the inexplicable phenomena of the functioning of the human body.

The monograph “Magnetochemical theory of metabolism”, which was written by Ukrainian Scientists

O. Mintser, M. Potyazhenko, G. Nevoit (Mintser, Potyazhenko, & Nevoit, 2021) received positive reviews from famous scientists of Ukraine (Boyko, 2022; Gulyar, 2022; Kolbun, 2022).

The practical significance and value of the magnetochemical theory of metabolism lies in the fact that it is a modern fundamental basis for the further progress of medicine and scientific research in many areas of medicine. It explains the behavior and chemical activity of molecules *in vivo*, which differs in fact from their activity *in vitro*. It explains the behavior of each cell in the human body and how each cell knows how it should develop, as well as the consistency and coherence of the simultaneous occurrence of a large number of chemical reactions and metabolic processes in the body. Therefore, the time has come to change the paradigm of thinking of doctors to the magnetochemical theory of metabolism and life.

Conclusion. 1. The magnetochemical theory of metabolism and life is a concept of modern scientific knowledge with great paradigm-transforming potential and important significance for fundamental medicine.

2. The magnetochemical theory of metabolism is a scientifically based basis for the further development of medicine and its branches: quantum pharmacology, quantum microbiology, bioelectronic medicine, etc.

3. The magnetochemical theory of metabolism is a new promising direction for continued scientific research.

Research work towards using the ideas of magnetochemical theory in the field of scientific research continues. In our opinion, one of the promising areas of the magnetochemical theory of metabolism is research into the biophotonics of the human body and the role of biophotons in intercellular communication in health and in pathology of internal organs.

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