

Representation of the Human Electromagnetic Field, Depicting the Heart as the Central Generator within a Toroidal Energy Structure

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ABSTRACT

The human body functions as a complex bioelectromagnetic system in which every cell communicates through coherent electromagnetic oscillations. The heart represents the central generator of this field, producing the strongest measurable magnetic resonance within the organism, approximately 5,000 times greater than that of the brain. This toroidal field not only coordinates intra-organismic processes but also interacts dynamically with the geomagnetic and Schumann frequencies of the Earth. From a biophysical perspective, this coherence between endogenous and exogenous electromagnetic fields constitutes the energetic foundation of regulation, communication, and self-healing. Disturbances in this resonance—caused by stress, toxins, or electromagnetic pollution—lead to functional dysregulation at the cellular and systemic level. Integrating magnetotherapy and neural therapy within the framework of regulatory medicine restores this lost coherence by harmonizing the autonomic nerves system and reactivating the body's natural information field. This holistic understanding redefines the human being not as a purely biochemical, but as a self-organizing bioelectromagnetic entity—an interface between light, energy, and consciousness.

Keywords: Human Electromagnetic Field, Heart Magnetic Resonance, Regulation Medicine, Bioelectromagnetic Coherence.

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Introduction

According to the current understanding of quantum physics, every atom is composed of a positively charged nucleus—containing protons and electrically neutral neutrons—and negatively charged electrons that orbit

the nucleus in discrete energy levels. Despite its apparent structural stability, the atom is not a rigid or static entity, but rather a dynamic system of oscillations, forces, and energetic interactions.

Within this microscopic universe, four fundamental forces

operate, shaping every process in the cosmos and thereby determining the structure, function, and dynamics of living matter itself (1–7):

1. The Gravitational Force: responsible for the attraction between all masses and for maintaining the coherence of large cosmic structures such as stars, planets, and galaxies. Although gravity appears weak at the atomic or molecular scale, it exerts universal influence at the macroscopic level and sustains the architecture of the universe.
2. The Weak Nuclear Force (Weak Interaction): Governs radioactive decay processes and plays a subtle yet significant role in biophysical systems, especially in the modulation of radiation effects on living tissues.
3. The Electromagnetic Force (Electromagnetic Interaction): The dominant force in the molecular, atomic, and biological realms. It determines the behavior of electrons around the nucleus, the formation and stability of chemical bonds, and the means through which biological structures interact and communicate.
4. The Strong Nuclear Force (Strong Interaction): Binds protons and neutrons within the atomic nucleus, counteracting the natural repulsion between positively charged protons and preventing the nucleus from disintegrating.

Among these four fundamental forces, the electromagnetic interaction is of central importance for the organization, regulation, and communication of living systems. It represents an invisible yet omnipresent energetic field, the universal carrier of order and coherence that interconnects every atomic and molecular process within living matter. While gravitation maintains the cohesion of the cosmos, it is the electromagnetic field that keeps the internal equilibrium and informational stability of the human body (1,2,3–9).

The Electromagnetic Structure of Matter

Between the atomic nucleus and its orbiting electrons lies an apparently empty region that accounts for approximately 99.999% of the atom's total volume. Contrary to the perception of emptiness, this space is permeated by electromagnetic fields and standing wave patterns. These are composed of oscillating electromagnetic waves whose energy is transmitted in discrete quanta known as photons.

Each photon represents a quantized packet of electromagnetic energy that propagates at the speed of light and simultaneously exhibits both wave and particle properties—a phenomenon known as wave–particle duality

(Fig. 1). This dual nature of light and matter, described in the foundations of quantum mechanics, forms the basis of all energetic communication in the living organism.

Energy transmission in nature does not occur as a continuous stream. Still, instead of discrete impulses, there is a flow of photons (Fig. 2). These photons are oscillations of energy, rhythmic pulses that carry not only energy but also information. In biological systems, photons are believed to facilitate communication between cells, modulate enzymatic activities, and regulate biochemical and bioelectrical reactions (1–9).

Biophysical Perspective: Life as an Electromagnetic System

Modern biophysical research demonstrates that all living organisms exist within an electromagnetic continuum. Every atom, molecule, cell, and organ both emits and receives electromagnetic signals. These signals, or bioelectromagnetic fields, form the foundation of cellular communication, regulatory control, and energetic homeostasis.

This understanding reveals that biological order is maintained through electromagnetic resonance and coherence. Within this framework, life itself can be defined as an organized system of electromagnetic oscillations in a state of dynamic equilibrium. Disruptions in these oscillatory patterns can manifest as dysregulation, disease, or functional imbalance, while restoration of resonance reestablishes health and vitality.

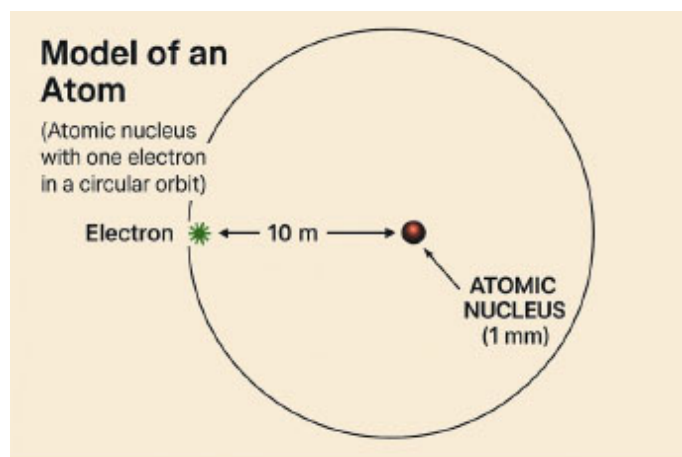


Figure 1. Simplified atomic model showing an electron orbiting a small atomic nucleus. There are vast empty spaces between the nucleus and the electrons. According to the quantum model of the atom, these spaces are filled with electromagnetic “photons.”

The insight that matters is, in essence, condensed energy structured by oscillatory patterns forms a conceptual bridge between modern physics and biology. The human being can therefore be described as an electromagnetic entity—a

living system of vibrations, existing in a delicate balance between order and entropy, between light and matter.

This concept is not merely theoretical but provides the biophysical foundation for regulation medicine, neural therapy, and other field-oriented medical approaches, in which the restoration of electromagnetic harmony plays a crucial therapeutic role (3–8).

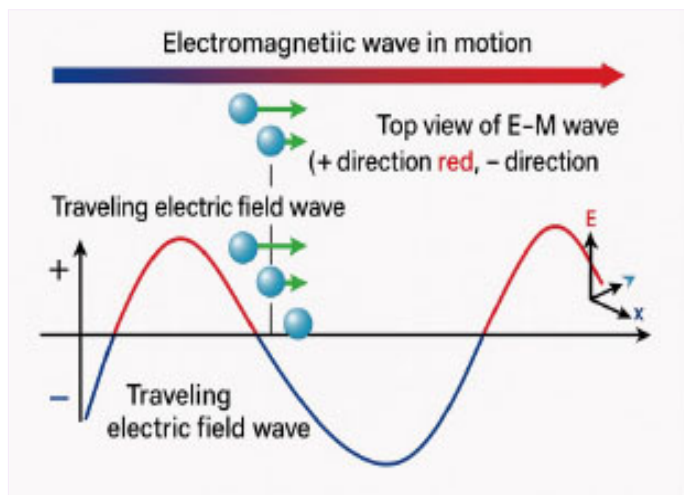


Figure 2. Diagram illustrating an electromagnetic wave in motion, showing the propagation of the electric field (red-blue wave) and particle movement along the wave path.

Matter as Condensed Light – The Role of Photons in Biological Regulation

According to the present understanding of quantum physics and biophysics, it is now well established that everything we perceive as “matter” is, in reality, condensed energy—composed explicitly of photons, or light quanta, organized in different vibrational states. Matter is therefore not a solid or static substance but a structured energetic state maintained through coherent vibrational patterns. In essence, what we can see, touch, or measure is nothing other than “shaped light” (3–12).

Throughout the cosmos, the number of photons exceeds that of nucleons (protons and neutrons) by the enormous ratio of approximately 9.746×10^8 : 1 (Fig. 3). This means that the visible, material portion of the universe—stars, planets, and living beings—represents only a minute fraction of its total energy and informational density. The vast majority of existence consists of pure electromagnetic waves, existing as photons in a continuous state of interaction and exchange (3–6).

Photons are not only carriers of energy, but more importantly, carriers of information. They have the unique ability to transmit structural and frequency-specific information across considerable distances without loss of coherence. This property makes photons the fundamental

mediators between physical energy and biological order. Within living systems, they play a central role in regulation, control, and communication. Every cell, enzyme, and neural network communicates through electromagnetic impulses—streams of photons oscillating in distinct frequency ranges (9–15).

Important Note: Modern biophoton research, pioneered by Fritz-Albert Popp and other biophysicists, has demonstrated that all living organisms emit biophotons—extremely weak but highly organized light pulses that serve as carriers of information within the body. These emissions are coherent, comparable to the structured emission of laser light, and enable a precise and instantaneous communication between cells. This discovery suggests that the human body does not regulate itself solely through chemical reactions, but also through electromagnetic information flows (13–15, 37,41).

Consequently, the human organism is not a closed biochemical system but an open electromagnetic information field. The regulation of all vital processes—metabolism, cell division, healing, hormonal control, and autonomic balance—depends on the continuous exchange of light-based information. Photons constitute the regulatory network of life, a ceaseless interplay of energy and information that maintains the body’s coherence and harmony (41).

Ultimately, the material manifestation of the human being is determined by a flow of photons vibrating in finely tuned resonance patterns. Any disturbance of this electromagnetic coherence—whether caused by stress, toxins, electromagnetic pollution, or emotional dysregulation—can lead to functional disorders and disease (1,10, 34).

Therapeutic approaches within regulation medicine, particularly neural therapy (Neural Therapy according to Huneke), aim to restore this disturbed electromagnetic order by reestablishing the natural information field of the body (1,10,15, 36,37). Against this background, human beings can no longer be regarded merely as biochemical entities but must be understood as bioelectromagnetic systems. The language of the cells is light, and the symphony of life is the orchestrated interaction of countless photons weaving together energy, information, and consciousness (1,8, 35).

This view was already anticipated by Prof. Dr. Friedrich Hund in his seminal 1954 publication “Materie als Feld” (Matter as a Field), published by Springer-Verlag, in which he described matter as a manifestation of structured electromagnetic energy (3,7,9, 33).

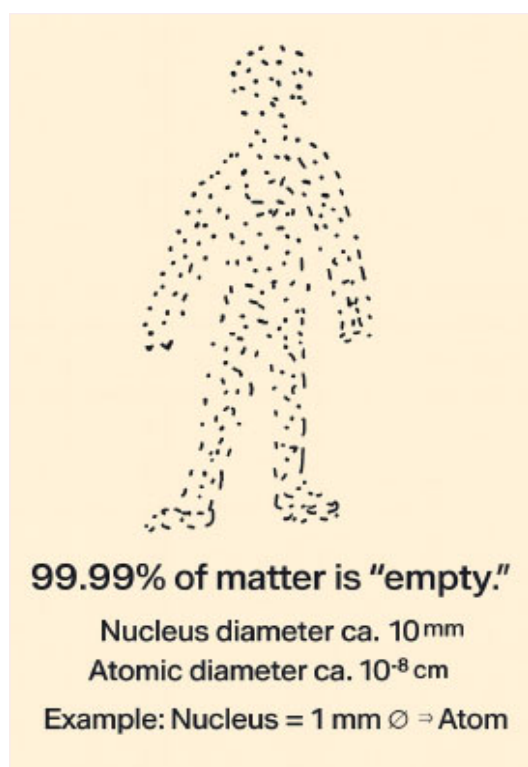


Figure 3. Visual representation showing that 99.99% of matter is space — illustrating the vast emptiness between the atomic nucleus and its electrons

Energy-and Frequency-Based Therapies

All life processes—growth, development, metabolism (including electrolyte, water, and acid–base balance), health, disease, and even death and decomposition—unfold on the material level through biochemical reaction pathways. However, the proper regulation of these processes—the coordination, synchronization, and systemic integration of the living organism—takes place on a higher informational and energetic level.

This recognition marks a paradigm shift in modern medicine: diagnostics and therapy can no longer be limited to the biochemical dimension of the body. Instead, they must also consider the informational and energetic aspects of the organism (9, 15, 16, 32, 34.).

Thus, a new medical paradigm has emerged—Energy and Information Medicine—based on the understanding that biological systems communicate not only chemically but primarily electromagnetically. Every cell, organ, and regulatory system operates through electromagnetic signals—vibrations, frequencies, and resonances—that maintain the inner balance, or homeostasis, of the organism (15, 16, 28, 30)

Foundations of Bioinformative Medicine According to Dr. W. Ludwig

The scientific principles of Bioinformative Medicine, as developed by Dr. W. Ludwig, are grounded in the findings

of quantum physics and particularly in the biophoton theory—the mutual quantum interactions among living systems. At the molecular and submolecular levels, a constant exchange of electromagnetic signals takes place within the human body. These so-called biophotons are coherent quanta of light that transmit information at the speed of light, enabling communication between cells, organs, and regulatory networks (2, 7–13, 29).

Important note: According to Regulation Medicine, the body's basic system—the extracellular matrix (ECM) as defined by Pischinger—functions as a wireless communication network. It receives, processes, and transmits oscillatory information necessary for the coordination of all biological functions. Through this network, metabolic reactions, detoxification processes, and autonomous regulation of the organism are controlled, particularly via the autonomic nervous system (ANS), which acts as the central mediator between the material and energetic dimensions (2, 9, 27,31).

Bioinformative Medicine as Information Therapy

Bioinformative Medicine represents a form of information therapy that works with harmonic oscillations specifically designed to stimulate the biofields of the human organism. This can be imagined as a transmission of coded frequency patterns—messages from a transmitting system to a receiving system—enabling communication on an energetic level (3,8,10, 32). The therapeutic effect is based on the principle of biological resonance:

A therapeutic signal becomes effective only when the applied frequency resonates with the body's own oscillatory patterns. If the frequency is too high, too low, or unspecific, no therapeutic resonance and thus no effect occurs (8–16, 23-25). For this reason, bioinformative therapy must be individually tailored, targeting the specific frequency patterns that promote self-regulation, detoxification, and healing.

Bioinformative medicine can be applied for both specific and nonspecific detoxification, as well as in the treatment of chronic infections. Moreover, it serves as a form of autogenic immunotherapy, activating the body's own defense mechanisms through harmonic resonance processes (7, 24, 27).

Frequency Medicine and Regulation

Energy and information medicine includes a variety of therapeutic modalities, all of which are based on the same biophysical principle: the transmission of information via photons. Among these methods are (2, 9, 12, 14, 31-36):

- Neural Therapy – regulation of the autonomic nervous

system through targeted impulses in interference fields.

- Acupuncture – modulation of bioenergetic meridians via electromagnetically active points.
- Magnetic Field Therapy – use of electromagnetic fields as carriers of therapeutic information.
- Biophoton and Laser Therapy – activation of cellular regulation through coherent light.
- Homeopathy and Bioresonance frequency and information based communication on a vibrational level.
- Phytotherapy and Chromotherapy (Color-Light Therapy) – stimulation through molecular and spectral resonance effects.
- Kinesiology, Proquant and Reviquant Systems – application of quantum biophysical frequency diagnostics and regulation.

All these therapeutic methods share a common principle: the therapeutic stimulus acts not chemically, but informationally. The electromagnetic field functions both as a carrier of energy and as an information medium, transmitting not only energy but also structure and meaning.

Electromagnetic Fields as Carriers of Therapeutic Information

In modern therapeutic systems—particularly in magnetic field therapy—the electromagnetic field fulfills a dual function. It acts, on one hand, as a therapeutic signal, providing targeted stimulation to biological control circuits; and on the other hand, as a carrier wave for encoded information. These frequency-coded signals correspond to the resonance frequencies of biological systems. Thus, the electromagnetic field becomes a mediating medium between matter and consciousness, between biochemical structure and energetic order. The future of medicine lies in this integration of paradigms the unification of classical physiology with quantum biophysics, of matter with information, and of energy with consciousness (2, 3, 4, 9, 11–15, 27, 33).

Physical Foundations of Electromagnetic Fields in the Human Organism

As early as the 19th century, Michael Faraday and Joseph Henry (1831) discovered the fundamental physical principle that an electric current flowing through a conductor generates a magnetic field in its surroundings. Conversely, a changing magnetic field can induce an electric current in a conductor.

This reciprocal interaction (known as electromagnetic induction) forms the basis not only of modern technology but also of the bioelectrical processes within the human body (Figs. 4 and 5). When one considers that every single cell in the human body possesses its own electrical potential (so called action potential) and that the autonomic nervous system extends throughout the organism like a finely woven network, it becomes evident that the human being is a highly complex electromagnetic system.

Important note: Each cell functions as a miniature electrical circuit, each nerve fiber as a conductor, and the entire body as a finely tuned network of electric and magnetic currents (7, 10, 22, 38).

Bioelectricity and Magnetism in the Human Body

The magnetic field of the human body arises from the movement of bioelectrical charges that is, from electrical currents flowing through cells, nerves, muscles, and organs. Wherever electric current exists, a corresponding magnetic field inevitably arises (Fig. 6).

This principle is Universal: All matter (whether living or inanimate) possesses a magnetic field that varies in strength according to its atomic and molecular structure. In non-living matter, the magnetic field originates from electron oscillations within atoms; in living organisms, it results from the vibrational activity of cells their bioelectrical impulses and electromagnetic communication (11–21, 32–35).

The more intense the vibration, the stronger the field generated. Thus, every living being produces a characteristic electromagnetic energy field reflecting its physiological and energetic integrity. This field is not merely a by-product but rather an essential functional component of biological processes (18–24).

The human body exhibits pronounced magnetic properties. Organs such as the heart, skeletal muscles, nervous system, and brain each generate specific magnetic fields. These fields are measurable? for example, by magnetocardiography (MCG), magnetoencephalography (MEG), or magnetomyography (MMG)? and they reflect the functional state of the corresponding organs (2, 11–18, 22–25, 32–26).

Among these, the heart generates the strongest magnetic field in the body approximately 5,000 times stronger than that of the brain. This cardiac field extends several meters beyond the physical boundaries of the body and plays a decisive role in intercellular and even interpersonal communication. Magnetism, therefore, is not an incidental by-product of physiology but an essential condition for life itself for both the origin and maintenance of biological order (3, 7).

The Three Fundamental Variables of a Magnetic Field

Three fundamental parameters define every magnetic field:

1. Frequency (Oscillation Rate): Describes the temporal variation of field intensity and determines the spectral range (from low to high frequency) in which the field operates. In biological systems, therapeutically relevant frequencies typically lie between 1 Hz and 10,000 Hz.
2. Spin orientation (Direction of Rotation): Defines the polarity of the magnetic field. Depending on whether the spin is right or left handed, different biological effects may occur. This directional property plays a crucial role in cellular communication and in the regulation of electromagnetic processes.
3. Field Strength or Amplitude (Magnitude) : Represents the intensity of the field. In biological systems, it must be finely tuned to evoke resonance without overloading or damaging the cell.

When these three variables (frequency, spin orientation, and field strength) are harmoniously aligned with the physiological oscillatory patterns of the body, a resonant effect occurs.

The organism recognizes the electromagnetic signal as self-congruent and responds by amplifying its own energy and regulatory activity. This principle forms the biophysical foundation for many energy and frequency based therapies, including magnetic field therapy, pulsed electromagnetic field (PEMF) therapy, and applications within neural treatment and regenerative medicine (2, 8, 9, 11–15, 37–41).

Significance for Regulatory Medicine

In Regenerative Medicine, the human body is regarded as an open electromagnetic system that is continuously engaged in the exchange of energy and information. Any disturbance of this electromagnetic equilibrium (whether caused by psychological stress, trauma, toxic burden, or environmental electromagnetic exposure) can lead to functional dysregulation within biological systems.

The primary goal of energetic and regulatory therapies is therefore to restore balance by harmonizing the electromagnetic coherence of the organism. When the body's electromagnetic fields are brought back into resonance, its self-regulatory and self-healing mechanisms can reestablish physiological harmony (1,9,11,22, 38,41).

This understanding underscores that the fundamental physical laws (such as those described by Faraday and Henry) apply not only to machines but also to living

systems. From a biophysical perspective, the human being is an electromagnetic entity whose health and vitality depend on the harmonious organization of its energy fields (1, 2, 4, 5, 16–18, 33–36, 40). In this view, disease represents not merely a biochemical imbalance but a loss of coherence within the body's energetic matrix.

Important note: Regulation Medicine, therefore, aims to reintegrate disrupted oscillatory patterns a process in which Neural Therapy, Magnetic Field Therapy, and Biophotonic Regulation play key roles in restoring the natural order of electromagnetic communication.

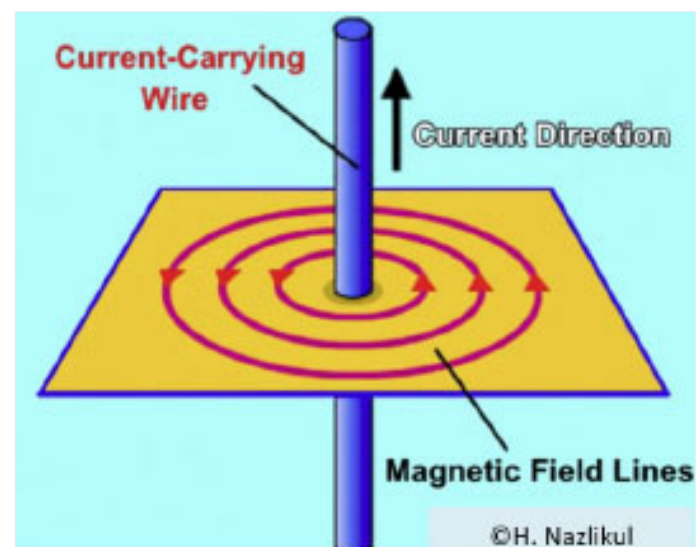


Figure 4. Magnetic field lines around a current-carrying conductor. The direction of the magnetic field forms concentric circles around the wire, following the right-hand rule relative to the current direction.

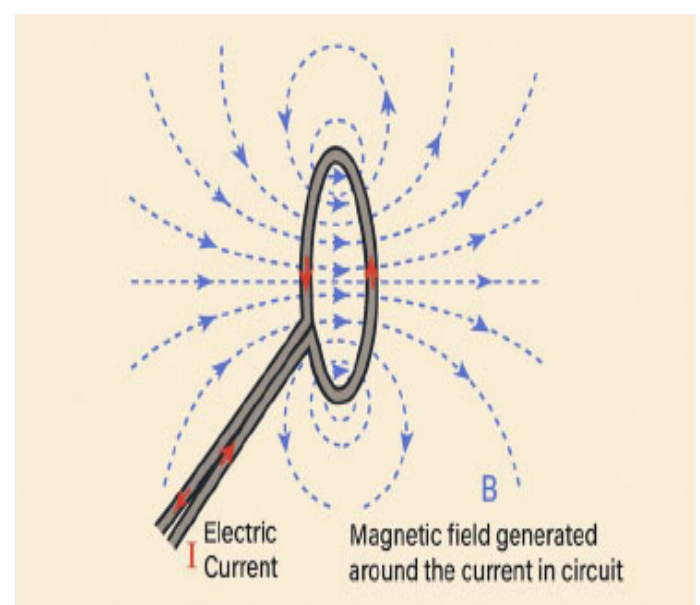


Figure 5. Magnetic field produced by an electric current flowing through a circular loop. The magnetic field lines form closed loops, indicating the direction and shape of the magnetic field (B) around the current (I).

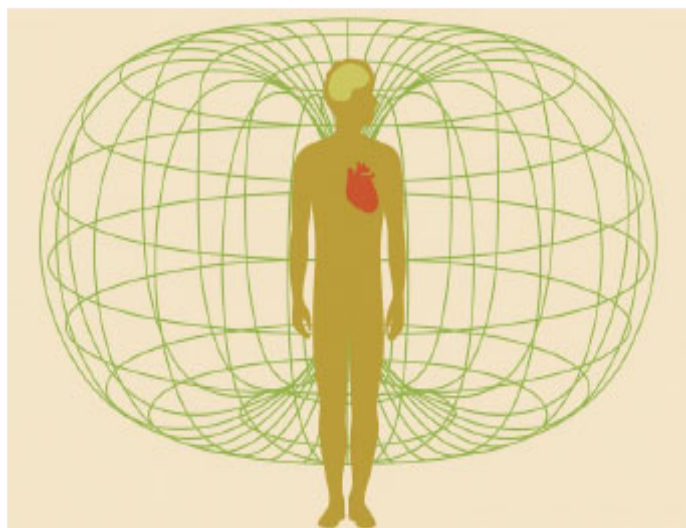


Figure 6. Representation of the human electromagnetic field, showing the heart as the central generator within a toroidal energy structure.

Three Life-Essential Magnetic Oscillations

Human beings are not only in constant interaction with their own intrinsic magnetic field but are also continuously influenced by the magnetic fields of their surrounding environment. Among all these natural electromagnetic oscillations, three specific frequency domains play a particularly vital role in sustaining biological life and regulatory balance (see Figure 7) (2, 11–15, 41).

Schumann Resonance

Between the Earth's surface and the ionosphere, electromagnetic standing waves are generated that oscillate at distinct resonance frequencies. This phenomenon was first described theoretically in 1952 by the German physicist Prof. Dr. W. O. Schumann.

Subsequent empirical measurements confirmed the existence of seven primary electromagnetic resonance frequencies within this atmospheric cavity approximately 7.8 Hz, 14 Hz, 20 Hz, 26 Hz, 33 Hz, 39 Hz, and 45 Hz. The most dominant and biologically relevant of these is the 7.8 Hz fundamental resonance, which has been shown to coincide with several intrinsic oscillatory rhythms of the human brain and autonomic nervous system.

Geomagnetic Frequency

These oscillations arise from the natural magnetism of the Earth's crust. The terrestrial crust possesses an inherent magnetization, primarily determined by the resonant vibrations of its 64 trace elements. The resulting magnetic frequencies propagate outward as geomagnetic fields, forming a subtle but pervasive energetic background that modulates the electromagnetic equilibrium of all living systems (31-34). These geomagnetic variations have been associated with measurable changes in cardiac, neural, and endocrine function, suggesting that human physiology remains entrained to the Earth's magnetic rhythm.

Solar Frequency

Solar frequencies originate from solar electromagnetic radiation, particularly within the shortwave and ultra-high frequency (UHF) spectrum. Sunlight does not merely provide thermal and photochemical energy it also transmits coded electromagnetic information that interacts with the Earth's geomagnetic and Schumann fields, influencing biological timing systems, circadian regulation, and neuroendocrine processes (3,8,10,13, 31-34).

Magneto-Biological Synchrony

Contemporary biophysical instrumentation (such as magnetocardiography (MCG), magnetoencephalography (MEG), and optomagnetic imaging) has made it possible to detect subtle magnetic fields generated within the human body, including those of the skeletal muscles, eyes, heart, and brain (31-35, 41).

These findings confirm that magnetic signals serve as a medium of internal communication between biological subsystems and that such signals operate in harmonic synchrony both within the body and with the Earth's magnetic environment (41). Several notable examples illustrate this natural resonance:

- The hippocampus, a key structure for memory and spatial orientation, exhibits intrinsic oscillations close to the Schumann resonance of 7.8 Hz.
- The thymus gland, central to immune regulation, resonates at approximately 1.2 Hz.
- The pineal gland's production of melatonin shows peak activity around 3 Hz, corresponding to low-frequency bioelectromagnetic rhythms associated with nocturnal regulation.

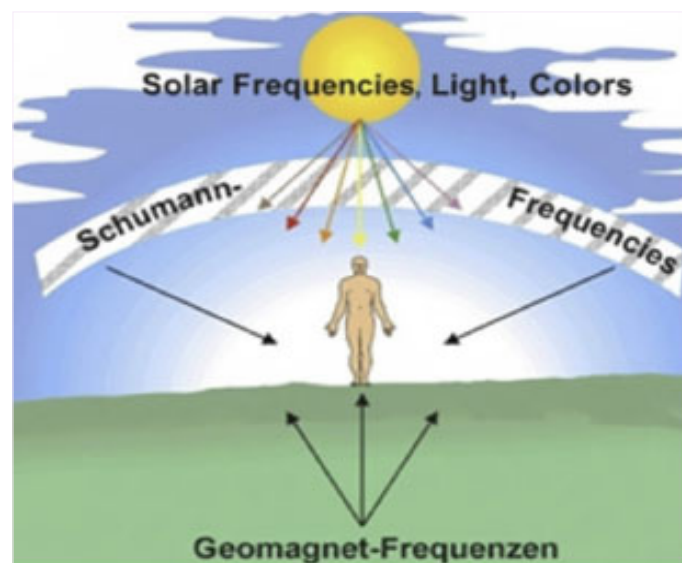


Figure 7. This image illustrates how the human body is influenced by natural energies from both the sky (Solar frequencies, light, colors, and Schumann frequencies) and the Earth (Geomagnetic frequencies).

The Harmful Effects of Electromagnetic Fields – Electromog and Disrupted Biological Resonance

The human organism is in continuous exchange with its environment not only biochemically, but also electromagnetically. Under physiological conditions, a subtle resonance and coherence exist between the endogenous magnetic field of the human body and the geomagnetic field of the Earth. This natural synchronization is of vital importance for the regulation of the autonomic nervous system, the circadian rhythm, cellular communication, and, ultimately, for overall well-being (31-34).

Disruption of Natural Electromagnetic Balance

In the modern world, this delicate balance is increasingly disturbed. One of the leading causes is the pervasive presence of artificial electromagnetic fields (EMFs) generated by technology, ranging from mobile phones, Wi-Fi routers, and household appliances to induction cooktops, power lines, and telecommunication antennas (10, 18, 34, 41). This has given rise to an entirely new form of environmental stress known as electromog (Fig. 7).

These manufactured fields superimpose and distort the natural magnetic frequencies to which the human organism has adapted over thousands of years of evolution. Particularly problematic is the fact that technical fields are typically incoherent, characterized by chaotic and fluctuating frequency patterns that can interfere with the body's cellular information networks.

Influence of the Modern Living Environment

Modern urban architecture further exacerbates this problem. The widespread use of concrete, asphalt, and insulation materials reduces direct contact between the human body and the Earth's natural magnetic field. This isolation (termed "decoupling from the geomagnetic field") impairs the exchange of ions and electromagnetic impulses between the body and the ground, leading to a measurable reduction in biological regulation and vitality (2, 5, 8, 17, 20, 35, 41).

Research by Dr. A. Warnke's group (Germany) demonstrated that the human body naturally resonates with external magnetic fields. When this resonance is disrupted (by incoherent artificial radiation, for instance) alterations occur in autonomic regulation parameters, cell membrane potentials, and hormonal balance (41). This phenomenon

is described in biophysics as "desynchronization of biological resonance."

Electromog as a Biophysical Stressor

Modern electromagnetic fields, especially in the high-frequency range (MHz–GHz), act as a chronic biophysical stress stimulus on living organisms. Because the human body itself is composed of electromagnetically active cells, it reacts to such fields with the same sensitivity as an electronic circuit exposed to interference. External EMFs can (10, 31-34):

- Alter cell membrane ion channels, leading to disrupted calcium homeostasis;
- Inhibit mitochondrial activity and ATP production, thereby reducing cellular energy;
- Increase oxidative stress and the formation of free radicals;
- Suppresses melatonin secretion, resulting in disturbed sleep quality;
- Causes an autonomic nervous system imbalance, typically favoring sympathetic overactivity;
- Destabilize DNA and enzymatic structures through resonant interference effects.

Within environmental medicine, electromog is now increasingly recognized as a chronic stressor, comparable in biological impact to chemical toxicity or psychological strain (41).

Importantly, although the body's adaptive mechanisms can offset short-term exposure, chronic low-intensity exposure has the potential to disrupt regulatory processes, causing functional blockages at the cellular and systemic levels (41).

The Human Being as an Electromagnetic Entity

When the human organism is understood as a biological information system governed by vibration, frequency, and electromagnetic order, it becomes evident that any non-resonant external radiation can disrupt this order. Like a finely tuned musical instrument, the body can become "out of tune" when chronically exposed to chaotic electromagnetic noise. The consequences are multifaceted and well-documented.

They include sleep disturbances, headaches, reduced concentration, cardiac arrhythmias, chronic fatigue, autonomic dysregulation, and impaired immune function. The most sensitive systems (such as the brain, heart, and endocrine organs) are particularly vulnerable due to their high electrical and electromagnetic activity.

Important note: The disruption of biological resonance by artificial electromagnetic fields represents one of the most underestimated environmental health challenges of modern civilization. Understanding the human being as an electromagnetic and regulatory system allows us to approach prevention and therapy more holistically—integrating neural therapy, regulation medicine, magnetic field therapy, and biophotonic modulation to restore the body's natural electromagnetic coherence and self-regulatory capacity.

The Path Toward Restoring Electromagnetic Balance

The recognition of these interrelationships has led to the development of new therapeutic paradigms within regulatory medicine. The primary objective of these approaches is the restoration of electromagnetic coherence within the human organism a state of internal resonance between biological systems and the natural electromagnetic environment. This can be achieved through several complementary methods, including:

- Magnetic field therapy utilizes physiologically tuned frequencies that resonate with cellular oscillations and enhance metabolic regulation.
- Neural therapy aims to release autonomic interference fields and reestablish vegetative balance.
- Grounding therapy (earthing) to reinitiate direct energetic exchange between the human body and the Earth's geomagnetic field,
- Conscious reduction of chronic high-frequency exposure (digital detox), minimizing cumulative electromagnetic stress from modern devices.

Reinterpreting Magnetism as a Healing Principle

Magnetism, when properly understood, is not a harmful or antagonistic force it is a universal form of energy fundamental to both life and regulation. Only through its misapplication and superimposition by incoherent artificial frequencies does it become detrimental to biological order?

In its natural form, magnetism sustains cellular communication, supports enzymatic regulation, and harmonizes the bioelectric environment necessary for self-organization and healing. From a regulatory medicine perspective, health can therefore be defined as a state of electromagnetic order, whereas disease represents the loss or disruption of this order. Restoring electromagnetic harmony (through coherent frequency stimulation, grounding, and reduction of interference) revitalizes the organism's intrinsic capacity for self-regulation, regeneration, and resilience (1, 2, 5, 7, 12–18).

Magnetic Field Therapy – Biophysical and Pathophysiological Foundations

Magnetic field therapy (magnetotherapy) represents a non-invasive physical therapeutic method based on the biophysical principles of electromagnetic interaction between field and matter.

It harnesses the ability of electromagnetic fields to influence biological systems at the molecular, cellular, and systemic levels. In modern medicine, magnetic fields are applied both diagnostically (such as in magnetic resonance imaging (MRI)) and therapeutically in a variety of clinical contexts (1, 2, 6, 7, 12, 24).

Biophysical Foundations of Magnetic Field Action

According to the principles of quantum physics, every living system possesses its own electromagnetic information field, which is in constant interaction with its surroundings. Within this context, magnetic fields act as carriers of information and energy, modulating oscillatory patterns essential for communication, regulation, and self-organization of biological structures (4, 12, 18).

In electrically conductive tissues, an externally applied pulsed magnetic field induces electric currents in accordance with Faraday's law of induction. These induced currents cause depolarization processes in neural, muscular, and epithelial tissues, thereby stimulating electrophysiological activity. Geddes described this mechanism as "electrode free electrical stimulation" a form of direct bioelectrical activation that requires no electrodes or direct current input. Significantly, the therapeutic effect depends on pulsed (time-varying) or alternating magnetic fields, since static magnetic fields do not induce depolarization in neuronal tissue (1, 6, 21, 22).

Resonance Principle and Information Transmission

Dr. A. Warnke and colleagues postulated that the biological resonance principle forms the foundation of magnetic field action. According to this concept, magnetic fields can resonate with organs, tissues, cells, and even molecules, thereby influencing pH balance, membrane potentials, and ionic fluxes. These effects act directly on cellular communication systems, particularly through:

- Modulation of calcium (Ca^{2+}) and sodium (Na^{+}) ion channels in cell membranes,
- Redistribution of electrical charges within the cytoplasm,
- Enhancement of electromagnetic coherence among cellular assemblies.

Low-frequency pulsed electromagnetic fields (PEMFs)

exert their primary effects on the cell membrane and mitochondria, where they modulate bioelectricity, ATP synthesis, and oxidative metabolism.

Warnke identified three primary mechanisms of pain reduction mediated by magnetic fields:

1. Active vasodilation through modulation of the autonomic nervous system,
2. Increase in tissue oxygen partial pressure,
3. Improvement of microcirculation and local perfusion (1).

Pathophysiological Aspects and Therapeutic Relevance

In the pathophysiology of many chronic diseases—particularly inflammatory, degenerative, and neurovegetative disorders—a disruption of electromagnetic cellular communication is a key factor. Altered membrane potentials, reduced mitochondrial ATP production, or disturbed calcium homeostasis result in decreased regenerative capacity and impaired regulation. Magnetic field therapy intervenes regulatively at this level:

It restores resonance relationships, harmonizes cellular oscillatory patterns, and enhances bioinformational transfer between cells. Clinical studies have demonstrated that pulsed electromagnetic fields (PEMF) can produce the following physiological effects:

- Anti-inflammatory effects through inhibition of pro-inflammatory cytokines,
- Anti-edematous effects via improved capillary permeability,
- Analgesic effects through suppression of nociceptive transmission in the spinal cord,
- Spasmolytic effects by reducing tonic muscle activity,
- Immunomodulatory effects through thymic activation and lymphocyte regulation,
- Endocrine regulation has a particular influence on the melatonin and cortisol axes.

In addition, PEMF exposure has been shown to enhance mitochondrial ATP synthesis, optimize the redox balance, and modulate calcium channel activity (Ca^{2+})—all of which are critical for healing, regeneration, and pain reduction (1, 2, 3, 4, 5, 6, 7, 8, 22).

Molecular and Enzymatic Regulation

Biophysical and molecular biological studies have identified multiple mechanisms underlying the effects of magnetic field therapy, including:

- Activation of lysosomal enzymes,

- Stimulation of DNA and collagen synthesis,
- Regulation of hormone secretion (e.g., endogenous cortisol, melatonin),
- Modulation of cyclic AMP (cAMP), protein kinases, and adenylate cyclase activity,
- Stabilization of membrane fluidity and receptor reactivity.

These mechanisms demonstrate that magnetic field therapy acts not merely symptomatically, but regulatively and systemically—in complete alignment with the principles of regenerative medicine.

The Biophysical Approach According to Dr. W. Ludwig

Dr. W. Ludwig emphasized that electromagnetic interactions within the human organism primarily serve informational purposes. Each cell functions simultaneously as a receiver and transmitter of electromagnetic signals. These signals coordinate intracellular and extracellular communication, regulate metabolic activity, cell division, differentiation, and healing processes.

According to Ludwig, modern medicine should not limit itself to the material or biochemical level, but should instead develop devices and therapeutic methods that directly stimulate the human biofield. Magnetic field therapy exemplifies this approach:

It acts in harmony with the organism's natural oscillatory patterns, restoring resonance capacity and biophysical coherence between the human body and its environment (4, 5, 8, 12).

Important note: Magnetic field therapy integrates physical, biochemical, and biophysical principles into a comprehensive regulatory medical framework. By addressing the energetic and informational dimensions of biological function, it reestablishes electromagnetic equilibrium, enhances self-regulatory mechanisms, and activates the innate healing potential of the organism. It thus represents one of the most advanced and scientifically substantiated applications of modern medical regulation, uniting the insights of physics, biology, and clinical medicine in a single therapeutic paradigm.

Magnetic Field Therapy in Clinical Practice – Systems and Biophysical Foundations

Over the past decades, a variety of medical devices have been developed for the therapeutic application of magnetic field therapy, each based on distinct technical and biophysical principles. Among the best-known systems

are Magnetotron, Vitapulse, and Medisend (AMS). These devices generate either pulsed or static magnetic fields of varying intensities and frequencies, which are applied using ring-, flat-, or mat-type applicators.(1,4, 6).

The therapeutic efficacy of magnetic field therapy depends critically on the wave characteristics, pulse configuration, and resonance frequency of the applied field. Magnetic impulses may be static (stationary) or time-varying (pulsed), the latter having demonstrated superior physiological relevance due to their resonance capacity.

Static Magnetic Field Therapy

Static magnetic field therapy employs magnets composed of different metallic alloys and in varying shapes and dimensions. Magnetic plates or bands are commonly applied directly to the skin (often over trigger points) to stimulate circulation, induce analgesia, and support wound healing. Clinical evidence, however, remains inconsistent. While Vallbona et al. reported positive effects on post-polio pain in a double-masked study, other investigations failed to reproduce statistically significant outcomes (1, 9).

Biophysical analyses further indicate that continuous exposure to non-rhythmic static fields can generate non-resonant electromagnetic signals, which may act as interfering fields (Störfelder) within biological regulation (10). Such persistent, non-physiological signals can disturb the body's natural frequency architecture, leading to dysregulation, especially in sensitive or elderly individuals.

Pulsed Magnetic Field Therapy (PMF)

The German physicist Dr. Wolfgang Ludwig is regarded as one of the pioneers of modern pulsed magnetic field therapy (PMF). According to his model, therapeutic stimulation must occur via biological resonance effects that is, the applied frequencies must correspond to the intrinsic oscillations of biological systems (4). Ludwig's experimental work demonstrated that electromagnetic signals can only be physiologically effective if they mirror the natural electromagnetic oscillations of the Earth and the human body. Only under such conditions can resonance occur, enabling cellular communication and regulatory activation (Fig. 8).

Pulsatility – Physiological Rhythm

The therapeutic signal must be pulsed and rhythmically modulated, reflecting the temporal dynamics of biological action potentials, such as those found in cell membranes and the nervous system. Non-physiological waveforms (such as rectangular or sawtooth pulses) fall outside the

body's natural adaptability and have been shown by Ludwig to impose stress on cells, potentially leading to autonomic overstimulation, particularly in elderly patients.

Position Within the “Biological Window” (Adey Window)

According to the research of **Prof. Dr. Ross Adey**, the human organism responds to electromagnetic fields only within a narrow range of field strengths and frequencies, referred to as the “biological window”. Only fields whose frequency and amplitude fall within this window are recognized as biologically coherent stimuli and can induce therapeutic effects (Fig. 9). Beyond this range, stimuli may either remain ineffective or exert dysregulating influences.

Important note: Therefore, precise tuning of signal intensity and resonance frequency is crucial for achieving therapeutic coherence.

Integration of Natural Frequency Spectra – Schumann, Geomagnetic, and Solar Frequencies

Ludwig emphasized that therapeutic electromagnetic systems should incorporate the three fundamental natural frequency ranges of the Earth:

- Schumann resonance (7.8 Hz) – atmospheric cavity resonance between the Earth and the ionosphere,
- Geomagnetic frequencies – oscillations arising from the Earth's crust,
- Solar frequencies – shortwave electromagnetic components of solar radiation.

These three frequency bands represent the biological norm ranges within which cellular regulation, synchronization, and homeostasis occur. They serve as the control signals of nature.

Important note: Only when these frequencies are integrated into therapy can a coherent electromagnetic milieu be created—one that reflects the physiological electromagnetic environment of the organism (2, 4, 10).

Biophysical Mechanisms of Action

Pulsed magnetic field therapy acts on multiple physiological and biophysical levels:

- Increased membrane permeability via activation of voltage-gated ion channels (particularly Ca^{2+} , Na^{+} , and K^{+}),
- Improved microcirculation through rhythmic vasodilation,
- Enhanced oxygen utilization in terminal tissues,

- Stimulation of mitochondrial activity and increased ATP synthesis,
- Activation of enzymatic chains (e.g., cytochrome oxidase),
- Normalization of autonomic dysregulation via modulation of the sympatho-vagal balance.

Important note: Resonance between the applied magnetic field and intrinsic cellular frequencies induces self-organizing biophysical processes, especially within systems of high electrical activity such as the nervous system, heart, hypothalamus, and endocrine glands (2,5).

Dr. Ludwig's Concept of the "Unaltered Natural Field"

Dr. Ludwig's magnetic field systems were specifically

designed to generate an electromagnetic biofield that closely corresponds to the frequencies and field structures of unaltered nature. In addition to physiological pulse forms and natural frequencies, these systems can integrate disease-specific resonance frequencies, enabling targeted therapeutic application. By combining biophysical precision, natural rhythmicity, and individual regulatory adaptation, Ludwig's systems embody a holistic therapeutic approach rooted in resonance and coherence principles (4).

Final Considerations

Pulsed magnetic field therapy represents a modern form of regenerative medicine based on the principles of biophysics, resonance, and information transfer. It promotes the restoration of physiological oscillatory patterns, harmonizes the bioelectrical balance of the organism, and supports self-regulation and healing.

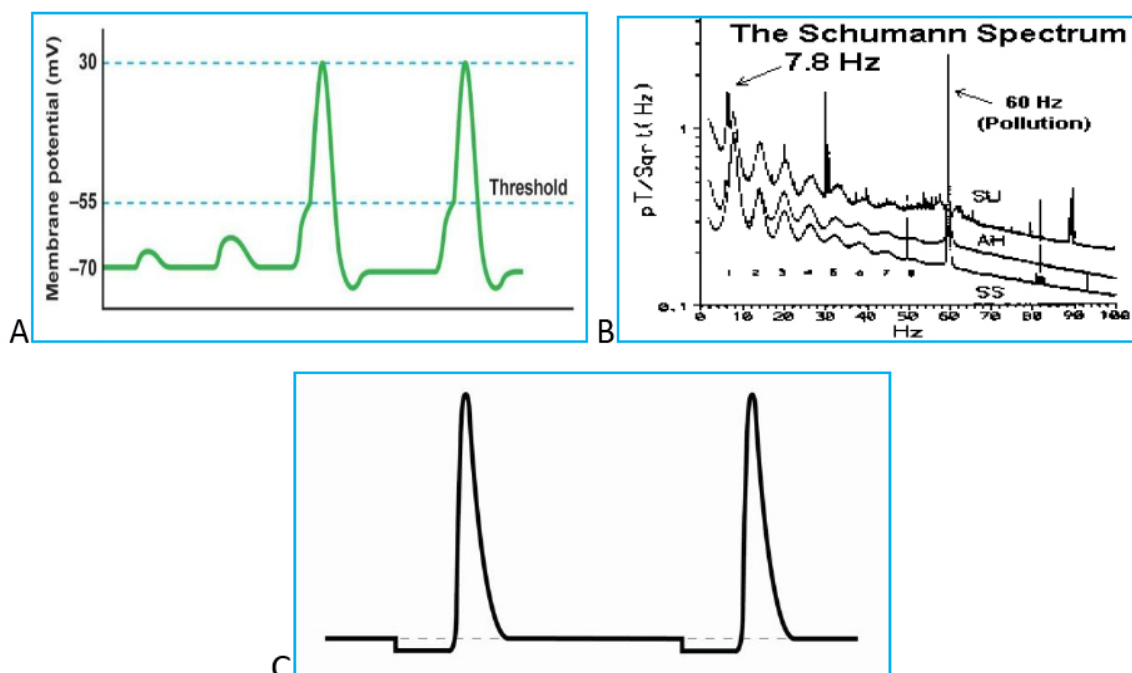


Figure 8. Artificially generated electromagnetic signals should match the frequency of our body and nature, or A: Membrane action potential. B: Schumann frequency. C: Curve of the pulsating magnetic field.

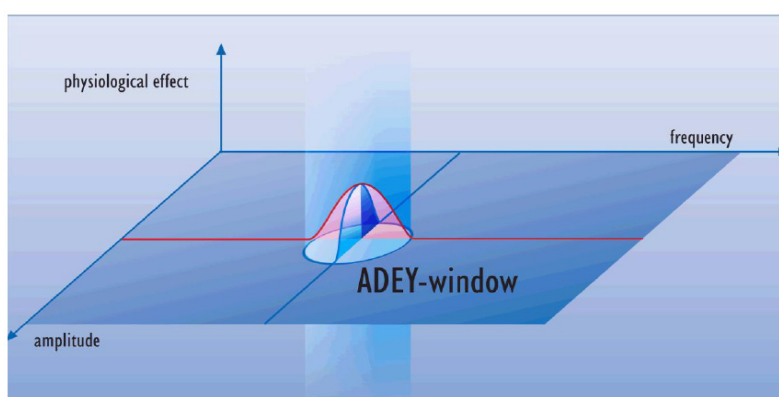


Figure 9. "Adey Window: The specific frequency range where biological systems show maximum sensitivity to electromagnetic fields

Clinical Applications of Magnetic Field Therapy

(Extended edition based on biophysical and clinical insights, 2025)

Historical Overview and Development

Since the early 20th century, medical devices capable of generating magnetic fields of various waveforms and frequencies have been developed. Even at that time, the therapeutic potential of electromagnetic fields in promoting healing, pain reduction, and functional regulation was recognized.

As early as 1938, Hensen reported the beneficial effects of magnetic fields on pain. In 1965, Bickford and Fremming demonstrated for the first time that magnetic fields can stimulate peripheral nerves in humans. By 1985, pulsed magnetic fields were shown to activate cortical areas and elicit peripheral responses—marking the early development of transcranial magnetic stimulation (TMS) (1, 41).

The seminal biophysical work of Dr. W. Ludwig and Prof. W. R. Adey laid the foundation for understanding biological resonance mechanisms of electromagnetic fields (31-35, 39). They demonstrated that such fields are not merely physical phenomena but also information carriers integrated into cellular regulatory processes (4,10).

Clinical Indications

Today, magnetic field therapy (MFT) is applied across a broad range of medical disciplines, including orthopedics, neurology, internal medicine, pain therapy, dermatology, and regenerative medicine (1, 2, 6, 11, 31-34, 40, 41). Based on the most recent literature (up to 2025), the principal clinical indications include:

Delayed or Impaired Bone Healing: (Pseudarthrosis, malunion, avascular necrosis). The most substantial evidence exists for the use of pulsed electromagnetic fields (PEMF) in enhancing bone regeneration. Studies report significantly increased osteoblastic activity, greater calcium deposition, and normalization of piezoelectric matrix potentials (1, 2, 11).

Tendinopathies and Soft-Tissue Injuries: In conditions such as rotator cuff lesions or postoperative recovery, PEMF therapy reduces edema, inflammation, and pain. Recent studies (2020–2024) demonstrate enhanced collagen synthesis, improved microcirculation, and faster functional rehabilitation.

Rheumatic Diseases and Osteoarthritis: PEMF modulates pro-inflammatory cytokines (TNF- α , IL-6) and oxidative stress pathways. In osteoarthritis, measurable

improvements in joint mobility, pain intensity (VAS), and inflammatory markers (CRP) have been observed (11, 38,39,40).

Complex Regional Pain Syndrome (CRPS): By regulating autonomic tone, PEMF reduces vasospasms, improves tissue trophism, and breaks the pain cycle through vegetative modulation (31-34, 39).

Local Osteoporotic Changes: PEMF stimulates osteoblasts, inhibits osteoclast activity, and enhances calcium ion conductance across cell membranes.

Respiratory Disorders: (Bronchitis, sinusitis). By improving local microcirculation and immune modulation, PEMF supports mucociliary clearance and reduces mucosal inflammation (31-34, 41).

Neurological Disorders

- **Migraine, neuralgia, neuritis:** Reduction of nociceptive input and pain transmission.
- **Peripheral facial palsy:** Promotion of nerve regeneration and axonal recovery
- **Spasticity and neurological fatigue:** Improvement of autonomic balance and neuroregulatory control.

Endocrine and Metabolic Dysfunctions: Specific frequencies (e.g., 1.2 Hz) have been shown to modulate the hypothalamic–pituitary axis, harmonize melatonin and cortisol rhythms, and regulate lipid metabolism(10).

Dermatological Indications: Conditions such as trophic ulcers, burns, post-traumatic edema, and hematomas exhibit accelerated healing due to increased cellular oxygenation and enhanced fibroblast activity.

Dosage, Frequency, and Treatment Parameters

The therapeutic efficacy of magnetic field therapy depends on the **field** strength, frequency, pulse form, and duration of exposure. Although international standardization remains incomplete, current biophysical evidence suggests the following correlations:

- **Low-frequency fields (0.5–30 Hz):** Stimulate cellular metabolism and membrane activity,
- **Mid-frequency fields (30–100 Hz):** Promote microcirculation and enzymatic activity,
- **High-frequency fields (>100 Hz):** Exhibit analgesic and neuroregulatory properties.

According to Dr. Ludwig, anti-inflammatory responses are observed at approximately 1.2 Hz, while analgesic effects are most pronounced around 10 Hz (10, 31-35). Recent 2025 studies combining HRV, microcirculation, and cell membrane analytics confirm that PEMF enhances

cellular coherence through ionic resonance mechanisms involving Ca^{2+} and Na^{+} channels, thereby improving bioelectromagnetic stability and regulatory capacity.

Safety and Contraindications

Magnetic field therapy is considered safe and well-tolerated, with no known toxic, carcinogenic, or genotoxic effects.

Contraindications include

- Pregnancy during the first trimester,
- Implanted electronic devices, such as pacemakers or cochlear implants,
- Large ferromagnetic implants within the treatment area.

When applied under appropriate parameters, magnetic field therapy demonstrates an excellent safety profile and broad clinical applicability.

Important note: Magnetic field therapy represents a scientifically grounded, biophysically coherent modality within modern regulatory medicine. Its mechanisms spanning from molecular regulation and autonomic balance to cellular resonance and mitochondrial activation make it a powerful tool for restoring physiological order and supporting the self-regulatory capacity of the organism. “The language of healing is frequency; the rhythm of health is coherence.” (33, 36, 37, 40, 41)

Discussion

Magnetic field therapy currently stands at the intersection of biophysics, medicine, and information science. Its clinical application reflects a paradigm shift in the understanding of the human body no longer viewed solely as a biochemical system, but as a biophysically and electromagnetically regulated organism.

From a biophysical perspective, magnetic fields act as vectors of information, capable of resynchronizing the energetic and regulatory flow within the organism. This perspective is particularly relevant in the context of chronic and multifactorial diseases, where conventional pharmacotherapy often reaches its systemic limitations.

The integration of magnetic field therapy (MFT) within regulatory medicine, especially in combination with neural treatment, reveals a profound therapeutic potential based on synergistic regulatory mechanisms:

- Neural therapy harmonizes the autonomic nervous system through precise local injections and the elimination of regulatory disturbances (interference fields).

- Magnetic field therapy stimulates the organism’s electromagnetic field level, restoring cellular resonance and optimizing bioinformational communication.

Together, these modalities promote a multimodal regulation that operates simultaneously on energetic, neuronal, and biochemical levels—supporting both systemic homeostasis and self-healing capacity. Recent research (2025) employing Heart Rate Variability (HRV) analysis, Bioscan, Vegatest, and Pulse Quick Check diagnostic systems has demonstrated that pulsed magnetic field therapy (PMF) effectively modulates autonomic imbalance, reduces oxidative stress, alleviates tissue hypoxia, and resolves inflammatory fields.

These findings substantiate the role of PMF as a non-invasive regulatory intervention capable of restoring biophysical coherence in complex, dysregulated systems.

Conclusion

The electromagnetic field of the heart represents far more than a physiological phenomenon—it constitutes the central axis of the human bioenergetic regulatory system. Biophysical investigations have demonstrated that coherence between the body’s intrinsic magnetic structures and the natural frequencies of the Earth is essential for maintaining cellular order, systemic equilibrium, and vital homeostasis. When this resonance is disrupted—through chronic stress, environmental toxins, or electromagnetic pollution (electrosmog)—decoherence arises, manifesting as chronic disease, dysautonomia, and energy deficiency.

Frequency and resonance based therapies particularly the combination of magnetic field therapy and neural therapy offer multidimensional means of restoring biological order. They enhance parasympathetic activity, optimize mitochondrial function, and reestablish electromagnetic communication at the cellular level, thereby reactivating the organism’s self-regulatory capacity. Within the framework of 21st-century medicine, this understanding of the human body as an information and energy system opens new avenues toward cost-effective, non-invasive, and integrative therapeutic strategies. Such approaches complement conventional medicine and lay the foundations for longevity, regeneration, and resilience. Magnetic field therapy represents a cost-efficient, low-risk, and scientifically grounded modality that significantly expands the therapeutic spectrum of modern medicine.

Key Arguments for Broader Clinical Application

1. Cost reduction within healthcare systems or
2. Chronic diseases account for over 80% of global healthcare expenditures.or

3. Magnetic field therapy can shorten treatment duration, reduce pharmaceutical dependency, and accelerate rehabilitation.or
4. Improved quality of treatment: or
5. By enhancing self-regulation and cellular communication, therapy resistance decreases and overall recovery potential improves. or
6. Synergy with regulatory medicine and neural therapy: or
7. When applied integratively, their effects are mutually reinforcing—pulsed magnetic fields (PMF) reactivate the organism’s electromagnetic field level, while neural therapy optimizes neuronal conductivity and autonomic regulation.
8. Research perspective:
9. Future progress requires large-scale, multicenter clinical studies using standardized protocols and objective biomarkers such as heart rate variability (HRV), inflammatory indices, and cellular ATP levels.

Magnetic field therapy is not a replacement, but rather a biophysical extension of medicine, taking seriously the concept of the living organism as a self-regulating informational network. It unites nature, frequency, and physiology, thereby opening new horizons for integrative, future-oriented medical practice.

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Conflict of Interest Statement

The authors declare that there are no conflicts of interest. The authors further confirm that no competing financial interests exist.

Ethics Approval and Consent to Participate

Not applicable.

Data Availability Statement

Not applicable.

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