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## RESEARCH

### ***ENERGY MEDICINE: CURRENT STATUS AND FUTURE PERSPECTIVES***

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#### **Abstract:**

Current practices in allopathic medicine measure different types of energy in the human body by using the same types of quantum field dynamics that are used in nuclear medicine, radiology and imaging diagnostics. Once diagnosed, current treatments revert to biochemistry instead of using biophysics therapies to treat the disturbances in subtle energies detected and used for diagnostics. Quantum physics teaches us that at the most fundamental level there is no difference between energy and matter. All systems in the human being, from the atomic to the molecular level, are constantly in motion – creating resonance. This resonance is important to understanding how subtle energy directs and maintains health and wellness in the human being. Energy medicine, whether human touch or device-based, is the use of known subtle energy fields to therapeutically assess and treat energetic imbalances, bringing the body's systems back to homeostasis (balance). The future of energy medicine depends on the ability of allopathic medicine to merge physics with biochemistry. Biophoton emissions, as well as signal transduction and cell signaling communication systems, are widely accepted in today's medicine. This technology needs to be expanded to include the existence of the human biofield (or human energy field) to better understand that disturbances in the coherence of energy patterns are indications of disease and aging. Future perspectives include understanding cellular voltage potentials and how they relate to health and wellness; understanding the overlap between the endocrine and chakra systems; and understanding how energy medicine therapeutically enhances psychoneuroimmunology (mind-body) medicine.

Keywords: Energy medicine; subtle energy; human energy field; human-touch; device-based

## **Introduction**

Energy Medicine has been defined as a branch of integrative medicine that studies the science of therapeutic applications of subtle energies. For centuries allopathic, or Western medicine, has investigated the body's internal systems from organs, tissues and cells to the current understanding of hormones and peptides. While modern medicine focuses primarily on physiology, the human organism includes many aspects that are not physical - aspects that generate and absorb massive amounts of information (Guyton 2011). Physiology interacts with its environment via ambient fields such as light, sound, electricity, magnetism, and with all other living organisms to generate massive amounts of information in the form of energy fields (Guyton 2011.). Voltage potentials (VPs) across cell membranes direct ion flux, modulating cell function (Funk 2009). VPs are involved in the therapeutic effects of pulsed electromagnetic field (PEMF) on immune function and tissue regeneration; on organ-associated frequencies instrumental in the endocrine/chakra systems (Williams 1981.); and on the regulatory mechanisms of neurotransmitter conversion of external fields into chemical or electrical energy involved in mind-body function known as psychoneuroimmunology (PNI). The subtle energies involved in these systems exhibit the internal and external aspects of the human being described as the human biofield or *human energy field* (HEF). To both understand and treat the entire human being, current practices in Western medicine must expand concepts of healing to incorporate physics of the HEF into modern medical practice. Knowledge of the existence of and effects on the HEF will

determine the future of medicine by opening new medical paradigms, integrating Western medicine with Eastern medical practices that have been time tested for thousands of years.

## **Current Status**

Current practices in Western medicine measure different types of energy in diagnostic procedures. These include sonograms, X-rays, magnetic resonance imaging (MRI), electrocardiogram (ECG), electroencephalogram (EEG), computed tomography (CT) and positron emission tomography (PET) scans involved in nuclear medicine, radiology, and imaging diagnostics. These devices image subtle energy emanating from the human body known as biophoton emissions (Levin 2012). Once the diagnosis using quantum mechanics is completed, current treatments revert to biochemistry instead of using treatments involving the subtle energies that made the original diagnosis. Quantum physics teaches us that at the most fundamental level there is no difference between energy and matter (Zurek 2022). All systems in an organism, from the atomic to the molecular level, are constantly in motion - creating resonance (Pereira 2015). This resonance is important to understanding how electromagnetism (radiation/light) can have different effects on the body. While all matter resonates, there are signature resonant frequencies, emitting unique characteristic signals from the nuclei of their respective atoms (Szent-Gyorgyi 1960, Gerber 1998). Most biomedical researchers agree that electromagnetic fields (EMF) surround and flow through the body in the form of electricity, with the heart registering the highest electrical

activity, emitting 2.5 Watts, producing 40 – 60 times more electricity than the brain (Helmreich 2013). The electrical activity of the heart and nervous systems interact and affect one another, with the heart being correlated with the highest magnetic activity (McCarty 2006).

Classic body systems include the nervous/enteric system, the circulatory system, the immune/lymphatic, digestive system, skeletal system, respiratory system, integumentary, endocrine, urinary/renal, and reproductive systems. Each of these systems is a channel for energy communication. For example, the nervous system transmits information to the proper part of the brain to be assimilated and sent back to a part of the body it intends to influence. Cerebral spinal fluid carries information that affects the endocrine, immune, and the central (CNS), sympathetic (SNS), and parasympathetic nervous systems (PNS) (Telano 2022). Psychoneuroimmunology (PNI), the relationship between the psyche (thoughts), neuroscience (CNS, SNS and PNS), and immunology, incorporates psychology with neurology, immunology, physiology, endocrinology, and rheumatology (Pestonjee 2013). Research suggests the mind and body communicate in a bidirectional flow of hormones, neuropeptides and cytokines (Pert 1997, Wakins 1997). In the immune system, protein molecules known as cytokines are the principal mediators of communication between the immune and neuroendocrine system, which results in immune system modulation, particularly regarding inflammation and infection (Natea 2016). Activated immune cells can permeate the blood-brain barrier and secrete cytokine mediators (Sachin 2012, Takeshita 2012, Schwartz 2013). Cytokines play an enormously important role in system

homeostasis during immune challenges (Turner 2014). Both immune and neuroendocrine systems share signaling molecules, primarily neuropeptides and cytokines, which promote communication with and between the systems of the body (ThyagaRajan 2012). These are examples of how the body has the capacity to function in a similar manner, with separate, yet fully interactive parts, maintaining homeostasis.

There is a substantial body of evidence to suggest that perceptions of one's environment can be profoundly immune enhancing or immune suppressive (Wakins 1997). Stress decreases the body's lymphocytes – the white blood cells that help fight off infection. Lower lymphocyte levels increase the risk of viral infection and common cold (Assinger 2014). Leukocytes not only modulate neuroendocrine peptide production via the CNS, but are capable of producing stress-associated peptides and hormones previously thought to reside exclusively in the CNS (Tsigos 2016). High stress levels can also cause anxiety and depression, leading to higher levels of inflammation (Vogelzangs 2013). Current medical science uses this biochemical model of molecules, cells, tissues, organs and systems to focus on an organized structure-function relationship of health and disease. This model needs to be expanded to deeper levels that include psychological and emotional, as well as electromagnetic and quantum processes that play a major role in how nature organizes itself.

### **Energy Medicine Defined**

Energy Medicine (EM) is the use of known subtle energy fields to therapeutically assess and treat energetic imbalances, bringing the body's systems (neurological, cardiovascular, respiratory, skeletal, endocrinal, emotional/psychological, etc.) back to

homeostasis. Knowledge of the existence of the HEF is the first step to understanding integral physiology, which unites body, mind, and spirit to treat the entire human being - not just the physiology (Ross 2009). The HEF has been described as a complex dynamic of electromagnetic fields that include individual oscillating electrically-charged moving particles such as ions, biophotons, and molecules, which create standing waves (Popp 2000). When these energy particles are exposed to energy medicine in the form of coherent energy patterns (e.g. pulsed electromagnetic fields (PEMF), vibrational medicine, Polarity Therapy, acupuncture, healing touch, etc.), the disturbed resonant patterns return to their original, coherent, harmonic vibrational state (homeostasis). If Western medicine applied the principles of modern physics, it would understand human beings are composed of information (energy) interacting with other energy (environment), to profoundly impact our physical and emotional health. The HEF has been investigated in scientific laboratories where photon emissions were detected using photometers and color filters (Cohen 2003, Wijk 2005, Kobayashi 2009, Vares 2016). Human energy vibrations were recorded at 1000 times higher in frequency than the electrical signals of nerve and muscle, with continuous dynamic modulation unlike the pulsing signals of the nervous system (Hunt 1996). Energy in the HEF is typically referred to as subtle energy, which is electromagnetic in nature (Oschman 2000). It is a system of wave-particle matter, transmitting and receiving vibrational information governing the physical matter of the body. Healing is achieved by directing coherent, harmonic energy into distortions caused by stressors and disease.

For many years Western medicine rejected the possibility that an EMF could affect biochemical mechanisms with such weak electrical fields. Biochemistry, however, is based on an understanding of the flow of energy that drives chemical reactions (Matyushov 2015). Physical properties of molecules can be combined to express internal energy and thermodynamic potentials, which are necessary for equilibrium and homeostasis in spontaneous processes (Ross 2019). New models of biophysics emphasize cooperative electrical activity of highly ordered elements at all levels of physiology: cells, tissues, organs, organ systems, as well as the entire body. Laboratory research both *in vivo* (animal) and *in vitro* (cell and tissue cultures) has shown important effects caused by low-frequency or weak EMF therapies, causing changes in cell proliferation, alterations in membrane structure and function, changes in nucleic acids, protein phosphorylation and adenosine triphosphate (ATP synthesis), as well as entrainment of brain rhythms and conditioned brain response (Adey 2004, Ross 2015). Parameters of these fields include frequency, intensity (field strength), waveform, and time of exposure ( Adey 2004, Ross 2015). Recognition of physiological sensitivities to *exogenous* EMF came from the observation of internal *endogenous* electrical processes (Ross 2019). An example of this is the piezoelectric properties of bone that use electromechanical control to determine which cells become osteoblasts or osteoclasts ( Marino 1970, Ross 2017). By modulating cellular processes with pulsed EMF, windows of opportunity for therapeutic application have been discovered for regeneration of osteoblasts to bone before becoming osteoclasts (Marino 1970, Ross 2017). All cells produce

electromagnetic fields because the human body produces complex electrical activity in all the body's 210 different cell types (Rahnama 2011). Neurons, endocrine cells, and muscle cells are all referred to as "excitable cells" (Rahnama 2011). These cells produce current (via electron transfer), magnetic field (via moving charges), pulsed frequencies, as well as pH, oxygen, carbon dioxide and light (via biophotons) (Rahnama 2011).

Detailed clinical research in biophysical stimulation has identified specific cellular processes responding to electromagnetic forces. Selective pathways at the cell plasma membrane are activated depending on the PEMF applied including voltage-gated calcium channels activated by capacitive coupling (Ross 2015), intracellular calcium flux modulated with inductive coupling (Ross 2016), and inositol phosphate by mechanical stimulation (Ryaby 2004). Basic research on cells, and animals, along with clinical studies on humans, have reported therapeutic dosimetry for frequency, intensity (field strength), waveform, orientation and time of exposure needed to activate specific processes in specific cells (Bassett 1989). Processes activated by PEMF signals have been reported in the plasma membrane's cell surface receptors through the cytoplasm into the nucleus and genes, where transcription factors affect translation of cell function (Funk 2006.). Externally applied EMF can affect orientation, migration and proliferation of cells, playing key roles in healing (Ross 2016).

### **Device-Based Treatment**

Research shows PEMF at extra low frequencies (ELF) is beneficial to immune system modulation (Ross 2013), as well as tissue regeneration (Ross 2015). PEMF can pass

through the skin into the body's conductive tissue, resulting in reduced pain and edema, and stimulation of wound healing shortly after trauma (Ross 2016). Electromagnetic therapies can affect cell signaling systems through the modulation of cytokine function (Ross 2013), send? messengers such as cyclic adenosine monophosphate (cAMP) (Ross 2014) transcription factor nuclear factor kappa B (NF- $\kappa$ B) (Ross 2013), and trigger tissue regeneration (Ross 2017), without cytotoxic or genotoxic effects (Ross 2018). EMFs oscillate at various frequencies; however, extra-low frequencies (< 100 Hz) are most commonly used for therapeutic purposes. Currently there are several types of EMF therapies being used in Western medicine. They include Laser surgery to resect hepatomas, metastatic tumors and colorectal liver metastases (Adam 2002); transcutaneous electrical nerve stimulation (TENS) to relieve acute and chronic pain (Ross 2016); cranial electrical stimulation (CES) for the treatment of neuroendocrine imbalance and chronic stress-associated diseases (Roh 2017); and pulsed electromagnetic field (PEMF) therapy, which has been approved by the United States Food and Drug Association (FDA) for the treatment of non-union fractures, muscle re-education and muscle spasm (Trock 2000), as well as improvement of blood flow to oxygenate tissue and improve energy levels (FDA approval Feb 2021). PEMF has also been used to treat osteoarthritis (Trock 1993), peripheral nerve pain (Ross 2016), wound healing (Ross 2017), spinal cord injury (Ross 2016), and cartilage repair (Ross 2015). Targeted pulsed magnetic fields are being used to treat depression in the form of transcranial magnetic stimulation (TMS) (Senova 2018). This therapy targets key areas of the brain that are underactive in people

with depression (Dunner 2014). Inefficient production of brain neurotransmitters (chemical messengers that send signals between brain cells) is brought back to homeostasis (Derstine 2010), without the adverse effects of anti-depressants (McGrath 2006).

PEMF medical devices are available to purchase, but expertise is needed to assure the patient is using the optimal frequency, field strength, and time of exposure for the tissue type being treated. These devices can be applied in two different ways – either by capacitive or inductive coupling. In capacitive coupling there is no contact with the body, whereas direct coupling requires the placement of opposing electrodes in direct contact with the surface of the targeted tissue. With inductive coupling (non-direct capacitive coupling), electrodes do not have to be in direct contact with the tissue because the electric field produces a magnetic field that, in turn, produces a current in the conductive tissues of the body (Stiller 1992, Trock 2000). PEMF therapy is based on Faraday's law, a basic law of electromagnetism that predicts how a magnetic field will interact with an electric circuit to produce an electromotive force known as electromagnetic induction. EMF has been stigmatized as a cancer causing agent; however, it is the ionizing EMF that emits high enough energy states to dislodge electrons from atoms (Ross 2013). It is the *non-ionizing* EMF that is used for therapeutic purposes.

Acupuncture can be considered an electromagnetic phenomenon due to the ionic charge between two acupuncture points (Ahn 2007, Gow 2012). Acupuncture needles with one metal (copper, silver, bronze, or an alloy) for the shaft and another metal for the handle, form tiny batteries (Gow 2012). Some

acupuncture therapies use additional electrical stimulation (2 – 4 Hz) applied to the needles. The positive potential at the needle tip attracts negatively charged ions from the interstitial medium, until a saturation equilibrium is achieved (2012, Chang 2013a, Chang 2013b). The normal functions of an organ tend to generate stronger and more harmonic ionic effects than organs with trauma or disease (Gao 2018). Acupuncture uses what is considered a wiring system in the body, as is the analog perineural nervous system (Langevin 2002), and ion transfer within blood plasma (Nordenstrom 1983).

### **Cellular Voltage Potentials**

To improve the current understanding of how the body works it is important to understand physics and electrical applications of cellular structure. In his book, *The Body Electric*, Robert O. Becker, MD, discusses the direct current (DC) system of glial cells involved in regenerating electrical feedback loops that influence the production and transmission of these voltage-gated action potentials in nerves (Becker 1985). For example, glial cells are non-neuronal cells that form myelin, and provide support and protection for neurons in the brain, and for neurons in other parts of the nervous system (such as the autonomic nervous system) (Jessen 1980). Nerve cells are constantly releasing neurotransmitters into the synaptic gaps between themselves and the neurons they contact. The direct current carried over these cells energetically effects the nerves they surround by influencing the pre-synaptic sites. Thus, the plasma membrane voltage potential determines the responsiveness of each neuron in releasing neurotransmitters on cue. These

signals can be modulated by exogenous fields such as electromagnetism ( Capone 2022).

## Conclusion

Without crossover applications of human touch and device-based energy medicine treatments well integrated and easily accepted in Western medicine, today's medicine will continue to lack the missing piece of science so desperately needed to complete the human cycle of existence. Physics must be blended with biochemistry to effectively treat the human being without adverse effects. It is clear that science and technology have resulted in vastly improved understanding, diagnosis, and treatment of disease, but the emphasis on biochemical treatment over quantum/energy-based treatment is creating adverse events in

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today's healthcare (Ross 2009, Desai 2016). The healing of a patient must include more than the biology and chemistry of their physical body; by necessity, it must also include the electrical aspects. Energy medicine is on the forefront of accepting this challenge.

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There are no conflicts of interest to declare.

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## **Bio:**

### **Christina L. Ross, PhD, BCPP, RPE**

Christina Ross, PhD, is a Board-Certified Polarity Practitioner (BCPP), Registered Polarity Educator (RPE), who has earned bachelor's degrees in both psychology and physics from the University of North Carolina at Greensboro, and a PhD in Energy Medicine from Akamai University. Her dissertation involved investigating the therapeutic effects of low frequency pulsed electromagnetic field (PEMF) on inflammation/immune function and pain biomarkers. She worked as a biophysicist at the Wake Forest School of Medicine from 2009 - 2021, studying the effects of low-frequency PEMF on cell communication and signal transduction.

She is currently collaborating with urologists at the Wake Forest Baptist Medical Center to study the therapeutic effects of PEMF devices to treat patients suffering from interstitial cystitis/painful bladder syndrome (IC/PBS). She is also involved in a pilot study for a clinical trial using PEMF as an adjunct treatment during bladder chemotherapy application to decrease pain and inflammation. She is also involved in the study of a basic research trial using PEMF therapy to treat bladder cancer cells.

She has served 3 years on the American Polarity Therapy Association (APTA) Board of Directors (2004 – 2007), two of which she served as Treasurer. She also served on the APTA Certification Governing Board from 2011 – 2016 as both a Director and Financial Officer. She served on the Certification Governing Council as a Director and Financial Officer from 2016 – 2023.

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