Anti-aging Magnetic Resonance Therapy

By Jerry Jacobson, DMD, PhD, IOM

Summary

A new holistic, natural, and noninvasive paradigm is presented for slowing our genomic-based biological clocks and decreasing heat energy requirements for maintenance of physiologic homeostasis. Ultimately, aging is considered the result of a progressive, slow burn within small volumes of tissues, producing increased quantum entropy, desiccation, microscopic scarring, and disruption of cooperative coherent signal transduction. Magnetic resonance therapy (MRT) utilizing physiologic signal-specific resonance energies is the natural way to maintain the structural integrity of critical biomolecules. Additionally, through electromagnetic modulation of autonomic nervous system (ANS) tonicity, MRT decreases heat energy exigencies, thereby slowing the progression of the aging process and the effects therefrom.

Introduction

Aging is generally considered to be the gradual deterioration of a mature organism resulting from time-dependent irreversible changes in structure. The definition of aging has proven difficult since many changes in older adults have been perceived as concomitants of normal aging. These changes are now recognized as diseases of later life. The process of aging addresses two sets of factors: those intrinsic and those extrinsic to an organism. The intrinsic factors operate on our bodies from within, such as the impact of genetic programming. Extrinsic factors represent influences on the body mainly from our environment, such as the impact of cumulative stresses. From an intrinsic point of view, we note that telomeres (end-stops for chromosomes) shorten gradually throughout the life cycle of dividing cells, suggesting that telomere length serves as a biological timing mechanism. Extrinsic challenges of life produce a multitude of stressors, stimulating the HPA axis to produce the stress hormone cortisol, a glucocorticoid naturally provided during increased sympathetic nervous system (SNS) tonicity. Cortisol's primary function is to produce gluconeogenesis, to enhance redistribution of energy quickly to regions that need it most, i.e., the brain and major muscles. The natural exigencies of life produce increased heat energy above the BMR level, enhancing desiccation of tissues, increase of microscopic scarring, quantum entropic (disordered) states, and aging. [2]

The Role of Magnetic Resonance Therapy

In consideration of the primary components of the aging process, MRT has been indicated to achieve the following:

1. Externally sourced physiologic magnetic fields may prove useful in the prevention of telomere shortening upon cell division. MRT utilizes target-specific EMFs calculated with a mathematical model. Through piezoelectric mechanisms, the structural integrity of critical molecules can be maintained. Piezoelectricity is a property of atomic crystal lattice structures, whereas the generation of electromagnetic oscillations (voltages) results when mechanical vibrations (mechanical forces) are applied. The converse is also true: mechanical vibrations result when electromagnetic resonant oscillations are applied to a structure. This is known as a photon-phonon transduction. The photon carries EM force as packets of energy or quanta. The phonon is a quantized vibration (mechanical) of an atomic crystal lattice structure. Indeed, there are piezoelectric effects (potential order inducing effects) inducible with nonionizing EMFs on numerous piezoelectric biological structures, including keratin, collagen, alpha and beta sheaths of protein, neurofilaments, bone, and even DNA.
2. Externally sourced physiologic EMFs in the PicoTesla (PT) range have been demonstrated to modulate vagal innervation and sympathetic innervation. One PT is about 50 million times weaker than the geo magnetic (the Earth's magnetic field). The challenges of life (physical, chemical, and emotional) all contribute to the actual longevity of an organism, seldom actualizing the maximum lifespan determined by the predisposing inherited characteristics of the genome.

Energy Metabolism

Energy metabolism is concerned with all of the transformative processes by which energy is made available for the production and maintenance of living organized matter. These global interactions provide heat and include cellular oxidative stresses. Free radicals add to heat production and slow burn of aging, and have been linked to atherosclerosis, cancer, osteoarthritis, Alzheimer's disease, cataracts, and immune deficiencies.

The energy state, tonicity, and bioelectric potential of nerves may be modulated by PicoTesla electromagnetic fields. Recalling our hypothesis that biomolecular resonance using nonionizing EMFs may be target-specific, Saxena et al. studied the effect of low-level extremely low frequency (ELF) EMFs on the restoration of forelimb grip strength and radial nerve ultrastructure in mice with induced toxic motor neuropathy. Field intensities, gradients, and frequencies were calculated with the Jacobson Resonance equations considering subcellular components vital for nerve function. Target molecules included nerve growth factor (NGF), microtubule associated protein (MAP), neurofilaments (NF), tubulin, acetylcholine, and calmodulin. The results demonstrated a significant biological effect on restoration of subcellular structures required for nerve impulse conduction and metabolism in nerves, and consequently a grip strength recovery from motor. Indeed, the renormalized, physiologic state of mitochondria, as observed, indicated normal membrane permeability and a recovery of ATP synthesis essential for nerve growth and repair. Renormalized Schwann cell function indicated that a nonneuronal control in the regeneration and growth of peripheral nerve fibers occurred.

Entropy

Proteins encompass three-fourths of the dry weight of most cells, and are involved in structure, hormones, enzymes, immune function, and essential life functions. Genes impart instructions for cellular function through transcriptional and translational processes providing these semi-crystalline piezoelectric structures that serve numerous functions. However, genes can be changed as time-dependent processes increase levels of "entropy" on fundamental levels. Vital structural and functional integrity of critical molecules are challenged with age, and the atomistic signal transductive coupling mechanisms for molecules are denigrated. Any system becomes progressively disordered (with increased entropy) as its temperature rises. This holds for processes in which the system remains in equilibrium throughout the change. These are known as reversible processes. Since a process at equilibrium can only change at an infinitesimal rate (as equilibrium processes are by definition unchanging), real processes can approach but never attain reversibility. Therefore, the entropy change in any real process is always greater than its ideal (reversible) value. When a system departs from and then returns to its initial state via a real process, e.g., transient states of sympathetic system stimulation, the entropy must increase even though the entropy of the system (a state function) does not change. In this regard, we consider a bio system as an intrinsic universe of electromagnetic interactions in constant flux, oscillating about a steady state system. [2,4]

Genomic Biological Clocks

Telomeres are essentially biological clocks and decrease in length with age. Once a critically shortened telomere length is attained, cellular senescence is activated, and when a sufficient number of cells undergo senescence in a tissue, a decline or loss of function of that tissue occurs. Telomeres are bound by a series of single and double-strand DNA-binding protein. Telomeres shorten with each cell's division due to incomplete lagging strand synthesis. Importantly, when conformational states of proteins are altered, this information can be transmitted to other structures. Interatomic communications through electromagnetic forces are at the root of all communications, i.e., signal transductive coupling mechanisms in living systems. Therefore, even though telomeres are considered noncoding repeating DNA sequences, when the binding protein undergoes atomic conformational changes as a result of incomplete lagging strand DNA synthesis, (mechanical error), electromagnetic communications may be sent to the rest of the DNA, inhibiting normal genetic information transfer mechanisms. Telomeres may serve as targets for magnetic resonance energies.

Studies at Mississippi State University screened a number of PicoTesla range magnetic field schedules. Calculations using the Jacobson Resonance equations were based upon molecules associated with human mammary carcinoma cell populations (HTB-126 and MCF-7) in multi well-tissue culture plates. Two schedules were found to compromise the viability and/or proliferation rate of HTB-126/MCF-7 cell types relative to untreated reference controls. Over the course of replicate studies (n=7), these PicoTesla schedules were observed to consistently inhibit the viability and/or proliferation. Several mRNA sequences were detected (n=3) that were expressed at higher levels (n=1) or uniquely expressed (n=2) in MCF-7 populations.

Biophysical Theory

Our bodies are a collection of trillions of atoms that must communicate incessantly, cooperate, and "work together" to produce functionality of the whole organism. Atoms constitute all matter, and atoms are permanent spinning magnets. Einstein said that all matter is condensed electromagnetic field comprised of fundamental elementary electrically charged particles. When the atomic structures of cells are challenged and denigrated, the quantum order and balance of life is impugned with the gradual increase in entropy. Heat is the energy associated with the random motions of the molecules, atoms, or smaller structural units of which matter is composed. A burn is a lesion caused by heat or any cauterizing agent. While heat energy is a normal product of metabolism basically under genetic control, environmental factors can negatively influence the natural processes of life. When emotional insults, disease, or injury strike, the intrinsic defense mechanisms of life proceed to provide increased energy, meeting demanded exigencies. Increased levels of energy will be utilized to reorder systems, but entropy will nevertheless increase within small volumes of tissues to increase microscopic scarring. Gradually, in spite of meeting physiologic exigencies, aging is the inevitable result when metabolic states are forced to increase over extended time frames. As life challenges progress, magnetic profiles of tissues are changed in accommodation to the requirements for maintenance of physiologic homeostasis. That is, atomic and subatomic structures will be reoriented in space and time as natural sequelae to transient disequilibria. With changing stress levels, magnetic profiles of tissues may become too strong, too weak, or unbalanced. These electromagnetic profiles (representing the fundamental structures of which biological tissues are composed) must be renormalized to reestablish a state of global health.

Magnetic Resonance Therapy (MRT)

How can we assist the body to heal itself more rapidly and with greater efficiency? We realize that improved efficiency in the renormalization of homeostasis (with a decrease in energy requirements) is useful for the slowing of aging. Normal physiologic magnetic profiles of human tissues have been measured directly with superconducting quantum interference detectors, or atomic magnetometers. These magnetic fields have been found to be in the PicoTesla range.

PicoTesla electromagnetic fields (PTEMFs) have been demonstrated to affect brain waves and enhance regeneration of nerve ultrastructure, affect autonomic nervous system tonicity, e.g., enhance parasympathetic stimulation to cardiac inputs and regulate atrioventricular conduction mechanisms of the heart (affecting rate and rhythmicity), modulate endogenous opioid activity (e.g., enkephalin, endorphin), and affect benefits in neurological disorders, such as Parkinson's disease, multiple sclerosis, and epilepsy. PTEMFs also have been shown to help speed wound healing and regulate thoracic spinal neuronal potentials after administration of noxious chemicals to the heart, which stimulated nociceptive afferent fibers, just to cite a few of the many studies conducted at major universities.

The plethora and diversity of reports in the literature concerning biological effects from nonionizing radiation (NIRs) may be based upon a fundamental, initial underpinning physical mechanism: a new particle-wave equation, mc2=BvLq, known as Jacobson Resonance. Many of the cited studies utilized calculated PicoTesla range magnetic field signal parameters derived from this new theory.

The results of Phase II double-blind, placebo-controlled, and randomized clinical studies in Parkinson's patients exhibiting motor fluctuations were quite interesting. Twelve subjects experienced 24 sessions of total body immersion in PicoTesla range magnetic fields administered over eight weeks. Standardized motor and nonmotor assessments were performed prior to treatment, at endpoint, and monthly for three months. It was demonstrated that PicoTesla range magnetic fields may improve motor and nonmotor features of Parkinson's beyond that achieved with standard medical therapy, and these effects are long lasting. Nonmotor symptoms have been increasingly recognized as a major source of disability in Parkinson's, for which current drug therapies are poorly effective. In contrast, subjects in the MRT study reported improvements in fatigue, sleep quality and quantity, and sense of smell. Larger placebo-controlled studies to further investigate the benefit of this unique, noninvasive, safe, and promising therapy are indicated.

Clinical studies using PicoTesla range magnetic fields at low frequency (<300Hz) demonstrated improvement of brain stem evoked potentials and cognitive responses in multiple sclerosis patients, possibly by modulating axonal and synaptic transmission as well as molecules crucial for immune responses.

A double-blinded, randomized, placebo-controlled study determined the efficacy of calculated MF signal parameters on subjects suffering with knee pain secondary to osteoarthritis. One hundred seventy-six patients pooled from four sites completed the study. Subjects were assigned randomly to one of two groups: the placebo group (magnet-off) or the active group (magnet-on). Each group received eight treatments over a two-week period. Each subject rated the pain level from one minimal to ten maximal before and after each treatment session on three separate instances: before treatment trials, during the treatment trials, and two weeks after treatment had terminated. The calculated flux densities were in the PicoTesla range and associated low frequencies were utilized. On average, subjects in the "on" group perceived a 46% reduction in pain after a treatment session. On average, subjects in the "off" group perceived an 8% reduction in pain after a treatment session.

The results showed a significant difference between the two groups. A two-way ANOVA (GLM) of the treatment sessions showed that the reduction in pain was significantly greater in the magnet "on" group ($p<0.001$) than the magnet "off" group. Additionally, of the 101 magnet "on" patients evaluated in the treatment sessions, 96% received statistically significant ($p<0.000$) reduction in pain levels. The results of this study point to a subtlety of life that has yet to be appreciated fully, as the benefits were shown to be durable.

We point to studies conducted at the University of Oklahoma Health Sciences Center, Arrhythmia Research Institute. Applying PTEMFs at the vagal trunks invasively or across the chest noninvasively, we found enhanced parasympathetic effects on the heart rate and atrioventricular conduction (AVC), both properties influenced by parasympathetic innervation.

Induced atrial fibrillation (AF) and tachycardia were suppressed by applied EMF. In an experimental model of induced AF, we found that the nerve clusters called ganglionated plexi (GP) found in specific vulnerable sites in the atria became hyperactive under the influence of excessive release of cholinergic (parasympathetic) and adrenergic (sympathetic) neurotransmitters. Low-level vagal nerve stimulation markedly attenuated the hyperactive state of the GP, thereby suppressing AF. In a recent experimental study, we recorded the neural activity of the GP and found that several hours of induced AF caused a significant increase in the amplitude and frequency, whereas low-level vagal nerve stimulation not only suppressed AF propensity, but also the increased amplitude and frequency of the hyperactive GP. A recent clinical report from our group has confirmed that low-level vagal nerve stimulation can mitigate AF in patients with the paroxysmal form of this arrhythmia. We found that a specific peptide, vasostatin-1 was released at low levels of vagal nerve stimulation. Studies in our experimental model of induced AF showed that vasostatin-1 suppressed AF by inhibiting GP hyperactivity by an antiautonomic action mediated by nitric oxide.

Using vasostatin-1 as the target molecule, low-level PTEMF was calculated with correspondent frequency. Applying this PTEMF signal at the vagal trunks and across the chest, we found that these low-level fields significantly suppress AF and also decreased the amplitude and frequency of the neural activity of the hyperactive GP. Cardiovascular responses are mediated by the autonomic innervation from the brain to the heart. Studies suggest that with age the control of the GP on the heart by the higher centers is markedly attenuated, allowing these lower centers to become independently hyperactive. This would help to explain the increased incidence of AF in the elderly population compared to younger cohorts.

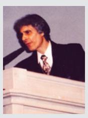
Conclusion

The decreased need for metabolic activity greater than the BMR diminishes the rate of biological aging by reducing heat energy production to meet exigencies of life. Through the enhancement of feelings of relaxation, PTEMF modulation of vagal innervation, the level of stress, strain, tension, and anxiety may be ameliorated. Thus, magnetic resonant energies may restore homeostatic function on all levels of structure and function. Microscopic scarring from excessive production of heat energies may be prevented, further restoring hydration of systems, coherence of biochemical signal transduction pathways, and diminution of errors in genetic information transfer to maximize the lifespan of the individual.

It may be possible to target telomeres and/or binding protein to prevent telomere shortening in adult cells. Indeed, PicoTesla magnetic resonance therapy looms as the new paradigm for amelioration of the aging process and the effects therefrom.

References

1. *Gelmann EP, Sawyers CL, and Rauscher III FJ (editors). Molecular Oncology: Causes of Cancer and Targets for Treatment. Cambridge University Press. UK; 2014:442-451.*
2. *Jacobson JI. Is the fusion process the basis for growth, repair and aging? Panminerva Medica (J. Ital Med. Assoc./Europa Medica). 1990;32(3):132-140.*
3. *Bistolfi F. Biostructures and radiation order disorder. Edizioni Minerva Medica. Torino. 1991:27,53,67,73,91,103.*
4. *Saxena A, Jacobson JI, Yamanashi WS, Scherlag BJ, and Saxena BB. A hypothetical construct explaining the mechanism of biological amplification in an experimental model utilizing PicoTesla (pT) electromagnetic fields. Medical Hypothesis (Elsevier Science Ltd). 2003;60(6):821-839.*
5. *Jacobson JI. A look at the possible mechanism and potential of magnetotherapy. Journal of Theoretical Biology (Academic Press). 1991;149:97-110.*
6. *Adey WR. Physiologic signaling across cell membranes and cooperative influences of extremely low frequency electromagnetic fields. Springer-Verlag: Biological Coherence and Response to External Stimuli. Herbert Frolich (ed). 1988:148-170.*
7. *Klepitskaya O, and Kumar R. Efficacy and safety of low-level electromagnetic field treatment in Parkinson's disease. Movement disorders, 2008;23(1):1628-37.*
8. *Jacobson JI, Gorman R, Yamanashi WS, Dayton M, Haltiwanger S, and Saxena BB. PicoTesla range magnetic fields tested in four-site double blind clinical study for treatment of osteoarthritis knees. Alternative Therapies in Health and Medicine. 2001;7(5):54-69.*
9. *Yu L, Dyer JW, Scherlag BJ, Stavrakis S, Sha Y, Sheng X, Garabelli P, Jacobson J, Po SS. The use of low-level electromagnetic fields to suppress atrial fibrillation. Heart Rhythm. 2015;12:809-817.*
10. *Jacobson JI. Reason For Life. Abbott Press (A Division of Writers Digest) Bloomington, Indiana. 2012:117-118.*



Prof. Dr. Jerry Jacobson, theoretical physicist, biophysicist, and medical researcher, is a world-renowned pioneer in the field of bioelectromagnetics. He currently serves as chief science officer for PicoTesla Magnetic Therapies, LLC and Magneceutical Health, LLC. He is a recipient of the Albert Einstein Genius Dedication by the American Biographical Institute and a member of the International Order of Merit, a distinction awarded by the International Biographical Centre, Cambridge, England. For more information, please see: www.magneceutical.com