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WHAT'S IN THE PATCHES?

All Lifewave Patch Products are:

- Constructed from organic materials (GRAS listed), namely **WATER, OXYGEN, GLUCOSE** and **AMINO ACIDS** (L-stereoisomers derived from fruit pigments). An aqueous solution is injected into a reservoir containing a small disc of fabric, sealed between 2 pieces of water-impermeable medical-grade polyethylene. The fabric serves as a template which allows the molecules to crystallize out of solution forming a matrix antenna composed of nanoscale crystals.
- Manufactured at US FDA-registered facilities
- **Registered with the FDA** and Australia's TGA as Class I medical devices. The natural organic materials in the patches were chosen for their safe, specific **optical properties**, designed such that none of the materials sealed within the patches will enter the body.

WHITE-colored patches are **positive**, best placed over acupuncture points that are positively charged, and typically worn on the right side of the body. **TAN**-colored patches are **negative**, most effective when placed on the skin over acupuncture points which are negatively charged, and typically worn on the left side of the body.

SUMMARY OF RESEARCH STUDIES

Full-text articles and additional research information can be downloaded from <http://www.lifewave.com/research.asp>

GENERAL PATCH TECHNOLOGY

In **November 2004**, the non-transdermal nature of the patches was proven by **MVA Scientific Consultants**. This study was done to confirm that LifeWave patches do not put chemicals into the human body. Brown RS. Patch Permeability, (Report of Results: MVA6158). MVA Scientific Consultants, November 23, 2004.

ENERGY ENHANCER PATCH

In May **2005**, **Dr. Frank Shallenberger** completed a placebo controlled, blinded pilot study and found that the LifeWave energy patches demonstrated significant and dramatic improvement in mitochondrial energy production after only one week of use. More notable yet is the fact that there was an even greater increase in the percentage of energy, both resting and under exertion that was derived from fat (Shallenberger, 2005).

In May 2005, **Dr. Dean Clark** completed a study called "The LifeWave Nanotechnology Energy Patch." This study was performed on 36 random individuals using infrared imaging as a method of measuring thermal changes that occurred when LifeWave energy enhancing patches were placed on the body. These measurements were done on people ranging in age from 22 to 72. The patches were placed on hyperthermic (warm) areas of the body that were identified with infrared imaging. The patches caused a cooling response in skin temperature readings both locally and distal from the site of application. The measured response of the patches is proof that the patches emit some form of energy to the body to cause a hyperthermic region to cool. This can only be

explained by the patches emitting a form of energy that influenced the autonomic nervous system via the subcutaneous vascular beds. This study confirmed with a different technology (infrared imaging) that changes occurred in the autonomic nervous system (Clark, 2005). Changes in the autonomic nervous system were also observed by Dr. Nazeran when he did his HRV study. This study has been submitted for publication and is currently undergoing peer review.

In September 2005, **Dr. Reenah McGill**, D.O.M., M.A., L.Ac. completed a study called, "Investigative Study of Long Term Effects of LifeWave Patches Using Electro Meridian Analysis System (EMAS)." This study was submitted for publication. Participants acting as their own control were randomly assigned to begin using active LifeWave Energy Enhancer patches for three weeks or placebo patches for three weeks. Patch placement was white on the right at San Jiao 5 and tan on the left at Kidney 4. Each participant maintained a daily energy log. Once a week their meridian energy was measured using Electro Meridian Analysis System (EMAS). This measurement was completed by a technician who was experienced with the EMAS, but who had no knowledge regarding assignment of active or placebo patch use. EMAS was compared with perceived energy. Participants reported an increase of energy corresponding to that shown by the EMAS measurements and self-report logs. Reported and recorded energy increases ranged from 18 % to 50 %. No adverse effects were reported. Study results indicated a substantial and sustained increase in perceived energy during the three weeks participants were using the active LifeWave Energy Enhancer Patches.

In **December 2005**, **Dr. Lauren DeRock** published a study called "Responsiveness of Horses to Biofrequency Modulation after Acupuncture Palpation" in the Journal of the American Holistic Veterinary Medical Association 2005 Oct-Dec;24(3):11-14. The objective of this study was to explore the use of acupuncture point palpation and application of biofrequency modulation (LifeWave Energy Enhancer patches) to specific points on the skin of horses. The goal was to see if LifeWave Energy Enhancer patches would relax the back and relieve back discomfort in horses. One hundred forty-two horses were evaluated. Four horses did not demonstrate back pain, and were not evaluated further. One hundred thirty-five of the remaining 138 horses with back pain showed elimination of back pain after patch placement for five minutes. Two horses who failed to respond initially showed elimination of back pain after reversal of patch position. One horse failed to respond. In conclusion, LifeWave Energy Enhancer patches when placed according to the technique outlined in this paper, consistently alleviated back pain in horses, as assessed by acupuncture palpation.

December 2005, "LifeWave Energy Patches 60-Subject Test: Final Report" A completed human Clinical Trial using LifeWave Energy Enhancer patches. This study was prepared for publication. This 30 day study involved 60-subjects of various, age, race, sex, and health and exercise levels. This was done without providing any kind of information to the subjects about the intended outcome or scope of this study. No educational material or advertisements were provided to the 60-subjects for the length of this study. Upon completion of 30-day testing significant measurements were found such as (1) An increase of 22.3 % was measured in the lipid side of the ATP cycle of energy production. As part of the Study for LifeWave Energy Patches, we found an **average of 22.3 % increase in the subject's ability to convert fat into energy** when the energy patches were applied to the subjects, (2) 30% of subjects reported an increased sense of well-being while wearing the patches, (3) Daily wear of the patches did not have any reported negative side effects or interactions for the length of this study, (3) Five subjects reported a weight loss of at least six pounds during this study, and (4) 100% of these subjects tolerated the patch test well.

February 2006, **Dr. Frank Shallenberger** completed a second LifeWave patch study with LifeWave Energy Enhancer patches that was a placebo controlled blinded study of 30 healthy patients of various ages. The results were prepared for publication. This study showed that LifeWave Energy Enhancer patches improved total aerobic ATP production (fat to energy). In addition 63 % of subjects showed statistically significant improvements when compared to the placebo patch. The average level of improved fat burning was an incredible 25.5%. The range of improvement was from 15% to 38%.

Field tests A number of informal studies were done with high school athletes and people who work out in Gyms prior to our formal studies at universities. 150 people participated in an informal weight lifting study at a local Atlanta Gym. The lowest improvement in strength/endurance that was measured in men was 20%, with an average improvement in strength of >30% in men. Results were even more remarkable in women, with the lowest improvement in strength endurance 50% and typical improvements of >200% in the number of reps performed while wearing the patches.

Dr. Gardner of Atlanta, GA. did a study in 2003 to see if electrical changes occur in the body when LIFEWAVE patches are touching the skin. When LIFEWAVE patches are held in the hands measurable electrical changes in the body occur within minutes, demonstrating an electrical interaction between the patches and the body.

University studies Formal double-blind placebo controlled studies of LifeWave patches were performed on athletes at Morehouse College in Atlanta, Georgia, USA. In 2003, a double-blind placebo-controlled bench press study in a group of 44 college football players by Joseph A. Goodson MS, ATC, Head Athletic Trainer. The athletes did a 60-minute workout that included weight lifting routines designed by the strength coaches, consisting of exercises including Bench Press, Dumbbell Flys, Shoulder Press, Lat Pulldowns, etc., performed for 3 sets of 8 repetitions each. During the tests, the athletes were asked to complete a questionnaire to report their results in the areas of how much weight lifted, recovery between exercises, muscle cramping, soreness, and overall feelings of energy after the weight lifting sessions were completed. Baseline data were collected on Monday morning, February 24, 2003 after the 60-minute workout. Based on prior experience, each athlete was asked to select a Bench Press weight of either 185 lb or 225 lb. Each athlete performed the exercise for one set doing as many repetitions as possible (to failure). Comparative data was collected on Thursday morning, February 27, 2003 again after the 60-minute workout. The study was set-up as a double-blind placebo controlled study. Prior to the testing day, a set of 60 envelopes were made up, numbered, and had randomly placed inside either a real set of LifeWave patches, a set of Placebo patches that only contained water (identical in appearance to the LifeWave patches) or a paper that said "Control". In addition, to make the test more challenging for the LifeWave technology, the Bench Press test was performed immediately after the athletes had completed the intense 60-minute upper body workout previously described. The CONTROL GROUP experienced an average improvement in repetitions from Monday to Thursday of **2.3%**. The PLACEBO GROUP experienced an average improvement in repetitions from Monday to Thursday of **4.9%**. The LIFEWAVE GROUP experienced an average improvement in strength endurance (no. of repetitions) from Monday to Thursday of **34%**.

ICEWAVE (PAIN) PATCH

Summary of IceWave Clinical Research Study – Infrared Imaging. Dr. Dean Clark, DC (Physician to the US Olympic Team), Dr. Steven Haltiwanger, MD CCN, Salvatore Palomares

Premise: The LifeWave IceWave patches create a cooling response to skin temperature readings. Evidence: A study on 36 random individuals using infrared imaging as a source of measuring thermal changes that occurred by placing LifeWave IceWave patches on the body and measuring the results. The response to the body by placing the patches in a region of hyperthermic state as measured by the infrared imaging proved a cooling response to the skin temperature readings both locally and distal from the site of application. Images were taken with an infrared camera measuring the spontaneous emitted heat patterns of the skin. This is considered a significant measurement of the autonomic nervous system. The overall thermal scale is on the bottom of the page ranging from 24.250-34.750°C. The normal human has only a 5 degree thermal window from hot to cold. The average thermal temperature pre patch is 32.239°C. The average thermal temperature post patch is 30.756 °C. The average Delta T is 1.483°C. Using a student t-test, a p value of 1.01E-05 is obtained. Since the p (probability) value of .00001 in this study is a p value < 0.05 this indicates that the

thermal temperature changes that occur when IceWave patches are used are statistically significant.

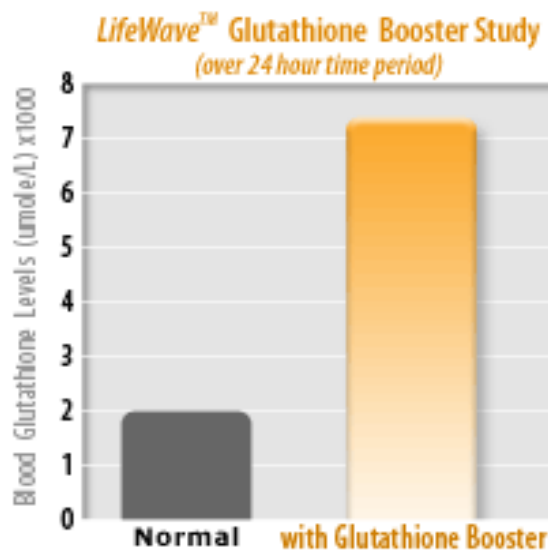
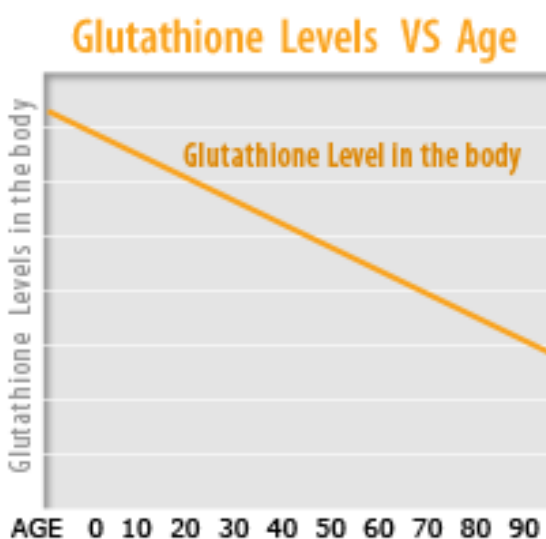
SILENT NIGHTS PATCH

From **June 13- July 1, 2005**, a study of the LifeWave sleep patch called Silent Nights was performed at the **Atlanta Sleep Center**. The study involved subjects who were studied three nights, each one week apart. The first night was the control night, when the subjects wore no patches. The subjects were then given Silent Nights patches to wear every night on their right temple leading up to and during the two additional studies of the subjects. Nocturnal polysomnography (eight hours of comprehensive physiological data during sleep) was conducted. The parameters of a standard polysomnography evaluation are measurements of breathing, heart activity, oxygen levels by oximetry data and sleep state. The sleep study results carried out in Atlanta showed that the Silent Nights patch was effective in promoting sleep efficiency in all subjects.

On **December 13, 2005, Dr. Dean Clark** reported his conclusions of Infrared Imaging of the Silent Nights patch. This study was written up for publication. Initial studies of the Silent Nights Patch confirm the findings observed with the energy patches resulting in the nervous system response by localized cooling of a hyperthermic region. An initial Infrared Imaging scan was done prior to placement of a Silent Nights patch. The Silent Nights patch was then applied to the temple region. Another Infrared Imaging scan was repeated in five minutes, the results showed significant thermal changes to the localized region and systemic changes in temperature were also apparent. In studies conducted on approximately 150 people, LifeWave patches created an overall autonomic nervous system response to a generally cool hyperthermic region when measured with sophisticated infrared technology. Conversely, when a region is hypothermic (cold) the patches will have the opposite effect on the area in warming the localized region. The patches provide a **thermo-regulating effect to the body causing the nervous system to respond in normalizing the anomalous response and changes of the body**. The measured changes included such things as pain relief, range of motion changes to stiff joints, bowel function improvement, overall energy improvement, and mental focus to name a few.

GLUTATHIONE PATCH

Haltiwanger S. A New Way to Increase Glutathione in the Body. *Hippocrates* Vol 28 Issue 1.



LifeWave has completed 16 double-blind placebo-controlled studies demonstrating the safety and effectiveness of the patch products. There are presently over 20 studies underway investigating existing products as well as new products not yet on the market.

** To optimize patch effectiveness, patch users must: drink mineralized water, optimally $\frac{1}{2}$ body weight in ounces; avoid food prepared with MSG; avoid aspartame

LIFEWAVE NANOTECHNOLOGY: HOW DOES IT WORK?

Overview: unique nature of LIFEWAVE patches

LifeWave patches are unlike any other patch technology currently sold in that they are non-transdermal – nothing enters the body. Successfully registered as a Class I medical device with the US FDA and the Australian TGA, the natural biological contents of the patches create biosignals that modulate the body's natural magnetic field in order to enhance certain specific biological reactions that are already naturally taking place. The organic materials have been chosen for their optical (chiral), liquid crystal and semi-conducting properties.

Biological molecules operate electronically as well as chemically; indeed, stimulation of the body with electrical or magnetic fields is a well-accepted practice in medicine (Malmivuo and Plonsey, 1995). LifeWave patch technology also uses bioelectric stimulation, however the stimulation is due to the production of specific electrical frequencies by the body's natural magnetic field from materials present in the patches. Using a nanotechnology production process called solution-based self-assembly, optically active and electrically conductive patch materials form nano-size molecular crystals that function as molecular antennae. Placing a conducting material [patch] in an oscillating magnetic field [human body] creates an electrical signal/frequency in the conducting material.

The proprietary solution in each patch type reflects photons of a specific wavelength of light, mimicking an existing biological reaction. Patches are applied on the acupoints of major meridians, as these are known to conduct light in the infrared range very efficiently.

Electrical nature of the body

The body's cells and tissues possess an intrinsic electric nature that permits the transmission of signals for information and control of biological processes (Malmivuo and Plonsey, 1995). The currency of information flow in the body is electron and ionic flow. Vision, hearing, and touch are all examples of the conduction of electrical information. The eye, ear and the skin have sensory transducers that convert light waves, sound waves and mechanical waves into bioelectrical signals that are conducted to the brain (Berne et al., 1993). Likewise, the biologically useful bioelectrical frequencies created by the LifeWave patches are resonantly coupled to small subcellular components of various cell types including membrane receptors and enzymes present in muscle tissues.

The mode of transmission of information in the nervous system is frequency modulation (FM). The brain in turn processes the information present in the bioelectrical signals (called action potentials) sent from the sensory organs and responds by sending out other bioelectrical signals via the nerves to control the voluntary contraction of muscles, hormone release, and various organ functions (Nicholls et al., 2001).

Human Biomagnetic Field

The SQUID (Superconducting Quantum Interference Device) magnetometer has shown the presence of a weak magnetic energy field around the human body. This biomagnetic field arises because of physiologic activities within the human body, which in electrical terms is a volume conductor. The biological activities of cells, tissues and the bloodstream generate electrical currents in the body and electrical fields that can be detected on the skin surface. As per the laws of physics, an electrical current flowing through a volume conductor always gives rise to a magnetic field (Jackson, 1975).

Biomagnetic signals are thought to arise from intra-cellular currents that are produced by muscular contraction or neural excitation of tissue cells (Rottier, 2000). The current produced in the cells flows out of the cells through cell membrane protein connections and cell ion channels into the extracellular matrix, creating bioelectric current flows in the body and hence a weak magnetic field. The magnetic field produced by the heart alone, is one-millionth the strength of the earth's

magnetic field (Baule et al., 1963); the brain's biomagnetic field is 100 times weaker than the heart's (Cohen, 1972).

Lifewave's Energy Enhancer patches behave as a passive transmitter system, with the pulsating magnetic field of the body acting as a high frequency carrier wave that is frequency modulated by the ingredients in the patches.

Absorption of electromagnetic energy by biological molecules

High-energy electromagnetic fields can cause heating, ionization and destruction of biological tissue, but lower energy fields have other more subtle biological effects. At low energy levels when resonance energy transfer occurs the transfer of charge is the main effect, not heating. According to Louis Heynick, low energy frequencies can change the orientations and configurations of molecules without altering or destroying the basic identities of the molecules (Heynick, 1987).

In order to resonantly activate specific biological molecules that are involved in certain metabolic reactions in biological tissues, the selection of electromagnetic frequencies must be matched to and specific for the absorption spectra of the molecules involved in the chemical reaction that you want to affect.

The interaction between the organic nano-sized crystals formed within the patches and the body's thermomagnetic field produces a specific set of oscillating bioelectrical signals that are transmitted into the body just like radio signals are sent from a transmitter to a home radio (receivers). Molecules that are already pre-tuned to the frequencies being transmitted receive these specific bioelectrical signals. When the frequency-specific energy is absorbed by these molecules, activation of biochemical reactions that are already naturally occurring can be enhanced.

Transmission of Patch Biosignals Into the Body

From the point of view of the electronic biology of the human body, the cells of the body contain liquid crystal components (proteins, membranes, membrane receptors, DNA, and RNA) that possess the electronic capability of resonating to certain specific frequencies like antennae (Beal, 1996a, 1996b). In a sense the body is constructed of liquid crystal oscillators. The biological liquid crystal molecules of the cell are organized in complex structures that exhibit cooperative behavior (Ho, 1998). When the correct specific bioelectrical frequencies are supplied to the cells of the body these liquid crystal molecules will resonantly absorb energy and information (Adey, 1988, 1993a; Beal, 1996a, 1996b).

The cellular components of the body behave as electrical circuits (since they have capacitive, inductive and resistive elements, biopotential voltage sources and ionic and electron current flows). This allows electricity and information that is carried by the frequencies of bioelectrical signals to pass into and out of the cells. Cells also have components composed of membranes, membrane receptors and cytoskeletal protein complexes that behave as tuning circuits. These cellular tuning circuits allow detection, resonant absorption and amplification of very specific bioelectrical signals that are in certain frequency and amplitude windows (Adey, 1981, 1988, 1993a; Garnett, 1998, 2002; Ho, 1998).

Frequency modulation of cell membrane receptors that function as electrical antennae/transducers results in voltage fluctuations across cell membranes at the frequency of the stimulus (Dallos, 1986; Russell et al., 1986). Frequency modulation will activate the receptors of cell membranes that respond to voltage changes and these receptors are in turn coupled to other membrane proteins that regulate the electrical, contractile and metabolic activity of cells.

Resonant energy transfer

The phenomena of resonance energy transfer can be demonstrated by identical tuning forks. When one fork is struck and then placed close to, but not touching, the other fork, the sound vibrations produced by the struck fork will actually transfer energy to the other tuning fork causing it to vibrate sympathetically.

Enzymes and membrane receptors, like all proteins, are folded into 3-dimensional structures. The three-dimensional structure of a protein arises because each protein is composed of a unique ordered sequence of amino acids. The proteins of human cells are all made of chiral molecules called L-amino acids (Nelson and Cox, 2000). Enzymes and receptors possess the ability to fluctuate back and forth between active and inactive states much like electrical switches that can either be set to an on or off positions. This cyclical movement between the active position and the rest position of these types of proteins involves a reversible shift in the distribution of electrical charges, which subsequently alters the 3-dimensional folding and chemical binding sites of these proteins. This alteration in protein folding, called a configurational or conformational change, is accompanied by changes in both the chemical reactivity and the electrical properties of these proteins (Wuddel and Apell, 1995). *New research has now proven that enzymes and receptors can be activated by electric charges directly transferred from resonantly coupled electric fields* (Derényi and Astumian, 1998). This is because the intramolecular charge transfer that occurs in enzymes and receptors undergoing conformational transitions within their cycle conveys to these molecules the ability to transduce energy directly from oscillating electric fields (Astumian et al., 1989).

Ross Adey and others have shown that weak electromagnetic fields may resonantly interact with the glycoproteins of the cell membrane acting like first messenger signals that activate intracellular enzymes (Adey, 1993b). These electromagnetic signals can create conformational changes in cell membrane proteins when these membrane proteins transductively couple with electromagnetic frequencies provided the frequencies are within certain amplitude and frequency windows (Adey, 1993b). This means the *cell membrane proteins can act like electrical transducers that behave as on off electrical switches that activate chemical processes inside of the cell* (Adey, 1980, 1981, 1988, 1993b; Adey et al., 1982).

The key step necessary for this mechanism to work is to produce an electric field in the body, which exactly matches the resonant frequency of the enzymatic process or membrane receptor that you wish to stimulate so that the enzyme or receptor is able to resonantly couple to the field. The Lifewave patches interact with the body's magnetic field to produce specific bioelectrical frequencies that resonantly transfer energy to turn on certain chemical processes in the body, e.g. accelerating the body's ability to burn fat as a fuel source for energy. *The patch technology does not create chemical reactions in the body; rather, it only assists biological reactions that are already taking place to work more efficiently.*

Magnetic induction

Faraday's Law of Induction, which is a basic law of electromagnetism (Jones and Childers, 1990), holds that a measurable electrical current can be created in a wire conductor simply by moving a magnet near the wire.

The LifeWave patch system has been designed to utilize the principle of induction, with the natural components in the patches functioning as small electronic conductors and antennae. When the body's oscillating magnetic field interacts with the electrically active molecules in the patches, the magnetic field induces the creation of electric fields through the Faraday effect. This induced electrical field contains the specific resonant frequencies of the materials contained within the patches. In addition, the natural oscillating magnetic field of the body acts like a carrier wave to couple these frequencies into the body.

The interaction of the body's magnetic field with LifeWave patches induces weak bioelectrical current flows of specific frequencies in the body's tissues. The specific sets of frequencies produced by the patches have been selected to activate certain chemical reactions and biological processes.

Biosignaling Effects of ENERGY ENHANCER Patches

Increased muscular stamina and production of energy from fats

1) The body's muscles are designed so that each muscle cell is connected to a nerve supply so that the brain can direct muscle fibers to contract or relax (Berne et al., 1993). When muscle fibers contract they are responding to nerve signals that have caused calcium ions to be released in the muscle fibers. One biosignal of the Energy Enhancer patch is to *increase calcium release in the muscles* so that a greater percentage of muscle fibers contract at the same time.

2) The primary energy sources within the human body are the burning of sugars or the burning of fats. The fuel value of sugar is 4.0 kcal per gram while fat burning produces 8.9 kcal per gram (Stipanuk, 2000). The human body has a natural preference for burning sugar as a fuel source, but since burning sugar produces less than half the energy as fats, any approach that increases fat burning increases energy availability.

In the average person the metabolism of fat becomes an increasingly important source of energy (ATP) production as the duration of exercise is prolonged. Unfortunately, this means that fat often does not become a ready source of energy for most people until a period of delay after the initiation of exercise.

The burning of fats as an energy source is absolutely dependent upon an amino acid called carnitine and the enzymes it interacts with. Carnitine is absolutely required for fatty acid metabolism and energy production in both cardiac and skeletal muscle, with a primary function to transport fat from the cytoplasm into the mitochondria where the fat is burned to produce energy. If the cells are not able to get fat into the mitochondria, they can't burn it. Thus, carnitine plays a central role in the production of cellular energy from fat (Heinonen, 1996).

Current scientific evidence has already shown that increasing the levels of carnitine in tissues by oral supplementation increases fat burning, especially in individuals who are carnitine deficient (Hoppel, 2003). For example, when cardiac patients are given L-carnitine supplements prior to cardiac stress tests, the heart pumps more blood more efficiently with fewer beats (Cacciatore et al., 1991).

The Energy Enhancer patches were specifically designed to increase the transport of long chain fatty acids into mitochondria by creating cellular frequency modulations that help optimize the activity of natural substances like carnitine. The effect: improved energy and stamina.

Biological Control by Frequency Codes

It is the interaction of enzymes with the food components (metabolites) that produce the energy supply and the building blocks needed by cells to maintain their own self-generating organization. According to Fritjof Capra, all cells use the same universal set of a few hundred small organic molecules as food for their metabolism. (Capra, 2002). The mechanisms that controls chemical reactions in cells are the electromagnetic oscillations or frequencies of the atoms of the substances involved (Brugemann, 1993). In a sense one could say that all biological processes are controlled by a chemical code that is in turn controlled by a frequency code.

According to the laws of physics everything in the universe is in a state of vibration. The resonant frequency of a material is defined as the natural vibratory rate or frequency of each substance be it an element or a molecule (Jones and Childers, 1990). ***Energy transfer can occur between materials when their resonant frequencies (oscillations) are matched.*** In addition when biological molecules in a cell are exposed to an externally applied or internally created electric field that matches their resonant frequency the field can be said to be coupled to the molecules and the molecules will subsequently absorb energy from the electric field. The cell membrane is the primary site of interaction between electric fields and the cell (Adey, 1993a).

Resonance occurs in biological molecules or even whole cells when acoustical or electric vibrations emitted from a generating source match the absorption frequency of the receiving structure producing an energy transference, which amplifies the natural vibrational frequency of the cell or the cell component (Beal, 1996a, 1996b).

All metabolic reactions of a cell are controlled by a complex interaction of regulatory processes that are usually defined by their chemical properties, however according to Brugemann, the internal chemical regulatory forces are in turn controlled by electromagnetic oscillations, which are biophysically specific (Brugemann, 1993). This physical principle makes it possible to obtain very specific metabolic responses when very weak electrical fields are applied or created in the body, which exactly match the frequency codes of the chemicals involved in the metabolic process you want to affect.

Numerous examples now exist in biology of chemical reactions being triggered in cells by extremely small amounts of certain specific signaling molecules such as prostaglandins and hormones. What is important is not just the amount of the substance involved, but that the required substance is available in exactly the right location at the right time. Some of the same effects can also be achieved with the application of electrical fields that have the same resonant frequencies of the signaling molecules.

When an electromagnetic field that possesses the resonant frequency of a biological molecule is generated in the body, conducting molecules of that particular type will absorb energy from the field and undergo induced electron flow. Field potentials that appear at the surface of the body are the basis of clinical electrocardiography (ECG), electromyography (EMG), electroencephalography (EEG).

A fact that is not widely understood is that the cells of the body are exquisitely responsive to electrical frequencies of exactly the right frequency and amplitude (Adey, 1993a, 1993b). The cells of the body have built-in electromagnetic filters so they only respond to electromagnetic fields of particular frequencies and amplitudes (Adey, 1993a, 1993b).

REFERENCES

- Adey WR. Frequency and power windowing in tissue interactions with weak electromagnetic fields. *Proc IEEE* 1980;68 (1):119-125.
- Adey WR. Tissue interactions with nonionizing electromagnetic fields. *Physiol Rev* 1981; 61:435-514.
- Adey WR. Physiological signaling across cell membranes and cooperative influences of extremely low frequency electromagnetic fields. In: *Biological Coherence and Response to External Stimuli*, H. Frohlich, ed., Heidelberg, Springer-Verlag, pgs 148-170, 1988.
- Adey WR. Whispering Between Cells: Electromagnetic fields and regulatory mechanism in tissue. *Frontier Perspectives* 1993a;3(2):21-25.
- Adey WR. Electromagnetics in biology and medicine. In *Modern Radio Science*, (ed. H. Matsumoto). Oxford, England: Oxford University Press, pgs 277-245, 1993b.
- Adey WR, Bawin FM., Lawrence AF. Effects of weak, amplitude-modulated fields on calcium efflux from awake cat cerebral cortex. *Bioelectromagnetics* 1982;3:295-308.
- Astumian RD, Chock PB, Tsong TY, et al. Effects of oscillations and energy-driven fluctuations on the dynamic of enzyme catalysis and free-energy transduction. *Phys Review* 1989;39(12):6416-6435.
- Astumian RD, Robertson B. Nonlinear Effect of an Oscillating Electric Field on Membrane Proteins. *J Chem Phys* 1989;91: 4891-4901.
- Baule GM, McFee R. Detection of the Magnetic Field of the Heart. *Am Heart J* 1963;66, 95-96.
- Beal J. *Biosystem Liquid Crystals: Several hypotheses relating to interacting mechanisms which may explain biosystem and human hypersensitivities to electric and magnetic fields.* 1996a.
Website:<http://www.cyberspaceorbit.com/BIOSYSTEMLIQUIDCRYSTALS> by JamesBeal.htm.
- Beal JB. *Biosystems liquid crystals & potential effects of natural & artificial electromagnetic fields (EMFs)* 1996b. Website: <http://frontpage.simnet.is/vgv/jim1.htm>
- Berne RM et al. *Physiology* 3rd edition. St. Louis, Mo: Mosby -Yearbook, Inc., 1993.
- Brugemann H. *Bioresonance and Multiresonance Therapy (BRT)*. Brussels, Belgium: Haug International, 1993.
- Cacciatore L, Cerio R, Ciarimboli M, et al. The therapeutic effect of L-carnitine in patients with exercise-

induced stable angina: a controlled study. *Drugs Exp Clin Res* 1991;17:225-235.

Capra F. *The Hidden Connections*. London, England: Flamingo, 2002.

Cohen D. Magnetoencephalography: detection of the brain's electrical activity with a superconducting magnetometer *Science* 1972;175: 664-666.

Dallos P. Neurobiology of cochlear inner and outer hair cells: intracellular recordings. *Hear Res* 1986;22:185-198.

Derényi I, Astumian RD. Spontaneous Onset of Coherence and Energy Storage by Membrane Transporters in an RLC Electric Circuit. *Phys Rev Lett* 1998;80:4602-4605.

Garnett M. *First Pulse: A Personal Journey in Cancer Research*. New York, NY: First Pulse Projects, 1998.

Garnett M. The Inductive Phase State of Gene Polymer Pulsation, Compensates for the Absence of Time, Energy, and Distance Parameters of the Genetic Code. <http://www.electrogenetics.net/electrogenetics.html>, 2002.

Heynick LN. Critique of the Literature on Bioeffects of Radiofrequency Radiation: A Comprehensive Review pertinent to Air Force Operations. Final Report USAFSAM-TR-87-3 (June 1987).

Ho MW. *The Rainbow and the Worm: The Physics of Organisms*, 2nd edition. River Edge, NJ: World Scientific, 1998.

Hoppel C. The role of carnitine in normal and altered fatty acid metabolism. *Am J Kidney Dis* 2003 Apr;41(4 Suppl 4):S4-12.

Jackson JD (1975): *Classical Electrodynamics*, 2nd edition. New York, NY: John Wiley, 1975.

Jones ER, Childers RL. *Contemporary College Physics*. Reading, MA: Addison-Wesley Publishing Company, 1990.

Malmivuo J, Plonsey R. *Bioelectromagnetism- Principles and Applications of Bioelectric and Biomagnetic Fields*. New York, NY: Oxford University Press, 1995.

Nelson DL, Cox MM. *Lehninger Principles of Biochemistry* 3rd edition. New York, NY: Worth Publishers, 2000.

Nicholls JG, Martin AR, Wallace BG, Fuchs PA. *From Neuron to Brain*, 4th edition. Sunderland, MA: Sinauer Associates, 2001.

Rottier R. The application of Superconductors in Medicine. 2000 September 20. See at: http://staff.ee.sun.ac.za/wjperold/Research/Superconductivity/Team/Rottier/art/biomag_apps.pdf.

Stipanuk MH. *Biochemical and Physiological Aspects of Human Nutrition*. Philadelphia, PN: W.B. Saunders Company, 2000.

Wuddel I, Apell HJ. Electrogenicity of the sodium transport pathway in the Na,K-ATPase probed by charge-pulse experiments. *Biophys J* 1995;69: 909-921.

Weekly Educational Conference Call with Lifewave Medical Team
WEDNESDAYS 9:00AM HK Time Dial USA Tel +1 (641) 594-7000 PIN: 952015#