The Science Behind LifeWave Technology Patches

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Introduction

The lay public and even professionals often misunderstand, ignore and even ridicule radically different technologies and new commercial products, when they appear to deviate too much from conventional established approaches. Every new commercial product has its own lifecycle. First it is born in the mind of its creator. Next it is produced and then marketed where it either fails or succeeds.

In order for the marketplace to accept and embrace a radically different new commercial product the public must understand a product's unique benefits and how it differs from other products on the market.

Purpose of this paper

- This paper will both review the theory behind the development of LIFEWAVE patches and discuss the effects of wearing these patches. The paper is divided into sections that will include a general discussion of how the technology works as well as scientific material with references. If you want to understand the technical aspects of how LifeWave's patch technology works you can read this paper as well as other articles and studies are on the website www.thelifewave.com

Concepts that are covered in the following sections include:

- **The unique nature of LIFEWAVE patches**
- **What is the payoff for people who buy and use this product?**
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- **The principle of magnetic induction**

- **How LIFEWAVE patches interface with the body's thermomagnetic field, the transformer analogy**

The unique nature of LIFEWAVE patches

- LifeWave patches are unlike any other patch technology currently sold. While other patches placed on the skin deliver substances into the body, LifeWave patches **are not** transdermal patches. Instead this technology is entirely new and unique. LifeWave patches **do not** put any substances into the body. Instead the safe natural biological substances contained within the patches are used to create specific information signals that modulate the body's natural magnetic field in order to enhance certain specific biological reactions that are already naturally taking place.
- In particular LIFEWAVE patches are designed to improve energy production from fats and increase stamina by utilizing valid but little known physical principles.
- New discoveries in biology have now determined that the biological molecules of the body work electronically as well as chemically.
- Stimulation of the body with electric or magnetic fields is a well-accepted practice in medicine. Most people are aware that electric or magnetic energy/frequencies can be generated and applied to the body with electronic devices that are external to the body (Malmivuo and Plonsey, 1995). The application of electric or magnetic energy to activate excitable tissues/cells and subcellular components is called *electric stimulation* or *magnetic stimulation*, respectively.
- **LifeWave patch technology also uses electric 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. Instead of putting a substance into the body the patch technology puts the frequency signature of the substance into the body. This paper will explain how chemical reactions can be activated by either chemical substances or by the frequency signals of chemical substances
- What David Schmidt, the inventor of LifeWave patches, has essentially done is to use **the electronic and magnetic features of the body like a cellular radio** to transmit information from his patches into the body to enhance the production of energy and stamina. His technological discovery applies research from many fields of science to promote the burning of fat as an energy source to produce greater strength-endurance. **More about this later.**

What is the payoff for people who buy and use this product?

- LifeWave patches were designed to make people winners. Most people involved in any type of physical activity will find they have more stamina and energy when they use these patches.
- Two of the characteristic effects that consistently are produced in individuals who wear LifeWave patches are an immediate and physically demonstrable **increase in energy** and **strength endurance** that occurs within minutes of

placing the patches on the body. The increase in strength endurance that has been repeatedly documented in our studies is not a chemical phenomenon such as would be the case with drugs like anabolic steroids. We think this effect is instead related to an increase in electron flows through the muscles so that a greater number of muscle fibers are able to contract together within a specific time period. This is a physiological process known as recruitment in which existing muscle mass is utilized more efficiently in the performance of some activity such as weight lifting. The website www.thelifewave.com can be reviewed for further explanation.

- If you are an athlete involved in organized sports and you improve your efficiency of energy production and stamina by 10-15 or 20% this may be the difference between winning and losing.

Field tests of LIFEWAVE patches

- 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%, but the average improvement in strength was over 30% in men. The women in the study had even more remarkable results with the lowest improvement in strength endurance being 50% and typical improvements in women being over 200% in the number of reps performed while wearing the patches.
- Dr. Gardner did a study in Atlanta, GA. 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. This study showed that **there is an electrical interaction between the patches and the body. More on this later.**

University and College studies

- Formal **double-blind placebo controlled** studies of LifeWave patches have already been done at Troy State University in Alabama and Morehouse College in Atlanta with athletes.
- The strength and conditioning coaches who have preformed these studies have found that the college athletes increased their stamina, and strength endurance while wearing the patches. These studies showed that athletes who wore the patches **had improved athletic performance**.
- **At Troy State University in June-July 2003 both Flat Bench Press (225lb.) and Push-Up studies were done with Coach Richard Shaughnessy as the principal investigator.** In the Flat Bench Press study the athletes in the test group who wore the patch had a 43.2% increase in strength performance. In a **Push-up study done at Troy State** the Troy State strength and endurance coaches found that the college athletes averaged up to 54% more push-ups in their third repetition set while wearing the patches.
- **At Morehouse College of Atlanta, GA. a study in November 2002 was done with college football players** by Joseph A. Goodson MS, ATC, Head Athletic Trainer at Morehouse College. The football players in this study wore the patches

during a 60-minute heavy training workout. In this study the subjects worked out on a fixed weight flat bench press until failure. The test group who wore the patches had an average increase in performance of 34%.

The role of information in society

- The control of information in our society is paramount to success. Good information, that is timely, can mean the difference between success and failure. Winners know that the acquisition and utilization of good information can lead to enhanced personal and business performance.
- **Information transfer** one hundred years ago was by telegraph, newspapers, letters, books and word of mouth, but in today's society information transfer is the new technological revolution where radio, television, satellites, cable systems, phones, faxes, computers and the internet continually transfer information to all parts of the world. The average person now uses these technologies daily.
- In today's society we all have access to electronic marvels that even the king's of old never even dreamed about. Yet electronic wonders like computers, telephones, cell phones, faxes, televisions and radios are so common we now take them for granted. People accept that radios, phones and televisions work because they see and hear for themselves that something is happening. The average person does not know how their radios, TVs and cell phones work, but they do know that they do work. We all rely on these and other communication devices every day to receive and transmit information to increase our personal and business efficiency and to give ourselves a performance edge.
- At this time in history a brand new technology has now become available that can give your body a personal performance edge. LifeWave patches are a new leap forward in performance enhancement technology. LifeWave patches have been designed to create specific biological information signals that can increase energy and endurance to help people be on the top of their game whether in sports, business or other aspects of their daily life.
- If you want to increase your energy and performance you owe it to yourself to take advantage of LifeWave's new biofrequency technology.

A discussion on cellular energy

- The single most important function of a cell is the continual and uninterrupted production of energy. Energy is essential, since it is needed to operate the biochemical machinery of all cells. In order to produce an adequate supply of energy the cells of the body require certain essential nutrients like vitamins, minerals, trace elements and amino acids that act as biocatalysts to accelerate the enzyme reactions of cells. These essential nutrients as well as the enzymes and other proteins of cells have both unique chemical structures and unique electromagnetic frequency patterns.
- It is commonly accepted that chemicals and enzymes are needed to initiate catalytic reactions, however basic scientific research has shown that the application of the correct frequencies can be used to further enhance cyclical catalytic reactions. This concept will be explored in more depth later in this paper.

Concepts of energy and information

- A scientist's conventional way of thinking about energy is to define energy as the capacity to do work. Several hundred years ago the Scottish inventor James Watt developed a more efficient steam engine that launched the Industrial Revolution. Watt did not invent the steam engine he simply discovered ways to make it more efficient.
- At the end of the 19th century Nikola Tesla invented the radio and an Italian inventor named Marconi commercialized it. Marconi simply made Tesla's discovery more efficient. The invention of the radio allowed people for the first time to use wireless communication to transmit electromagnetic energy from one place to another. With the invention of the radio we see that electromagnetic energy can be used to transmit information from one place to many places. We now take wireless information transfer for granted.
- What David Schmidt, the inventor of LifeWave technology, has done is develop an effective system of delivering certain specific natural biological frequencies into the body to turbo charge the chemical reactions involved in the burning of fat to produce energy and electrochemical reactions involved in producing muscle stamina. Many people at this point may dismiss this idea and David's LifeWave technology as hogwash. If a person has their mind made up and closed nothing I say here will convince them to change their mind. However this paper is written for curious individuals who are open minded enough to investigate whether such a thing is possible.

Analogies

- Understanding the mechanism of action of these patches is difficult for most people since the general belief is that increased energy production in the body can only result from the use of substances that are consumed or absorbed through the skin.
- My experience is that people don't believe that LIFEWAVE patches can work because these patches don't put anything into the body except frequencies.
- I have found that one way of understanding the technology behind LifeWave patches is through the use of analogies like the concept of radio or electrical transformers. I will review these concepts later in the paper in order to help relate the physics principles that underlie the mechanism of action of these patches.

The electric 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).
- 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 electrical signals that are sent to the brain (Berne et al., 1993).
- The brain in turn processes **the information present in the electrical signals** sent from the sensory organs and responds by sending out other electrical signals

through the nerves to control the voluntary contraction of muscles, the activity of the body's organs, hormone release, and so on (Nicholls et al., 2001).

- It is well accepted that **information can be conveyed to the body** in the form of electromagnetic waves. No one doubts that the eyes can detect visible light and ears can detect sound and that the information collected is invaluable. However both visible light and sound are **just different portions** of the electromagnetic spectrum. It is logical to conclude and it has been proven scientifically that other portions of the electromagnetic spectrum also have beneficial biological effects.
- The key step necessary for utilization of these other beneficial portions of the electromagnetic spectrum is to develop **a delivery system** that can provide safe, and specific electrical frequencies that promote valuable effects. LifeWave patches are basically a technology that provides the body with another group of biologically important electrical frequencies that are present in different portions of the electromagnetic spectrum than visible light and sound.
- The cellular components of the organs of the eyes and ears respond to electrical frequencies that they are tuned to receive. The biologically useful electrical frequencies created by the LifeWave patches are resonantly received by small subcellular components such as membrane receptors and enzymes that are present in **other organs** such as the muscles.
- The use of specific electrical frequencies to promote energy production from fat in the muscles is similar to the activation of cellular structures in an organ like the eye with visible light frequencies. In both examples **signals are passed into the body** that can initiate biological chemical reactions. LIFEWAVE patches just activate different organs with a different set of electrical frequencies.
- Examples of effects seen with LifeWave patches include: performance enhancement and improved strength endurance. If you are involved in physical activity LifeWave technology can provide a valuable assist to being on the top of your game.

LIFEWAVE patches increase stamina and enhance performance

- 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 to be released in the fibers. This process is called excitation-contraction coupling. The release of calcium by the nerves initiates the mechanism of muscle fiber contraction. When the muscle needs to relax calcium goes back into storage.
- For those interested in more detail, excitation--contraction coupling involves a process where chemical and electrical signals are coupled at the membrane surface of muscle cells causing the intracellular release of calcium (Ca^{2+}), which initiates the contraction of muscle fibers (Catterall, 1991). Electrical impulses from spinal nerves cause a release of the neurotransmitter acetylcholine in an area known as the neuromuscular junction. When acetylcholine binds to its receptor on the muscle cell membrane, which is called the sarcolemma, an action potential is generated. This action potential activates voltage sensitive receptors in invaginations of the muscle cell membrane called T tubules, which results in the

release of calcium into muscle fibers and the initiation of muscle fiber contraction (Berne et al., 1993).

- When a muscle such as the biceps is activated by putting tension on it by lifting a weight the muscle responds by causing a percentage of muscle fibers to contract. But not all of the fibers in a muscle contract at the same time. The goal of training is to condition the muscle to increase or recruit more muscle fibers to contract at the same time. A highly trained athlete is able to recruit more muscle fibers to contract than an unconditioned person, but even so there is still some percentage of fibers that do not contract because calcium is not released in all muscle fibers at the same time.
- Besides the fat burning and energy enhancing effects, LifeWave patches have also been designed to deliver specific signals that increase calcium release in the muscles so that a greater percentage of muscle fibers contract at the same time.
- Along with the increased energy from accelerating fat metabolism this translates into greater strength endurance and performance.
- If you are running, bicycling, weight lifting, or playing tennis, golf, soccer, baseball, football etc you want to have sustained stamina, energy and strength. You don't want to be tired in the middle of your workout, race or game.
- If you watch a college football game you will see at the beginning of the game that the players are all excited and energized when they are running out on the field. But if you watch that same team come out on the field after the halftime break you will see some of the players are walking slower back on the field because they are tired. If you are a coach you want to have a team that is coming out at halftime still ready to go when the other team is tired.
- The coaches who have used our patches have found that the players don't tire as fast during the game. We have basically found that athletes have improved performance when they use LIFEWAVE patches.
- **Performance enhancement** is the most exciting thing most people who have tried this technology experience. This is what the patches are designed to accomplish! Whether you are a professional athlete, a weekend warrior or just want to have enough energy to go shopping and cook dinner LifeWave patches were designed for you.

LIFEWAVE patches increase the production of energy from fats

- The primary energy sources within the human body are the burning of sugars or the burning of fats. The human body has a natural preference for burning sugar as a fuel source, but burning sugar only produces about half as much energy as can be obtained from fats.
- 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 an amino acid that is both produced by the body and obtained from the diet. Carnitine is absolutely required for fatty acid metabolism and energy

production in both cardiac and skeletal muscle. Carnitine's primary function in the body is to transport fat from the cytoplasm of the cells 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. Therefore it can be seen that carnitine plays a central role in the production of cellular energy from fat (Heinonen, 1996).

- Optimal functioning of the carnitine transport mechanism allows the body to burn fat at the fastest rate possible. 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, it has been found that the heart pumps more blood more efficiently with fewer beats (Cacciatore et al., 1991).
- LifeWave patches were specifically designed to increase the transport of long chain fatty acids into the mitochondrial powerhouses of the cells. What David Schmidt has done is profoundly different than giving oral supplements. Instead, he has applied the principles of physics to create cellular frequency modulations that help optimize the activity of natural substances like carnitine in the cells. Use of an electrical field effect results in noticeable changes in minutes not hours in cellular energy production. This immediate effect has been consistently seen in the research studies already completed with LifeWave patches.
- Users of LifeWave patches have experienced immediate and demonstrable increases in physical stamina within minutes after wearing the patches. Actual improvements obtained from users have been as low as 8% to as high as 400%. The basic principle is that the patches create frequency modulation in the body.
- This frequency modulation improves the transport of long chain fatty acids into the mitochondria where they are burned for fuel resulting in improved energy and stamina.
- The organic materials in the LifeWave sports patches have been specifically selected to match the resonant and sympathetic frequencies of biological components involved in mitochondrial energy production, while not interfering with the other primary objective of the technology, namely assisting in the flow of calcium ions into muscle cells to increase recruitment of muscle fibers during exertion.

The Body is controlled by codes

- Science is based on the natural laws. One of the accepted laws of biology is that all biological life consists of cells and it is **the genetic code** contained in the DNA of cells that controls development of the cell and the production of proteins in the cell (Capra, 2002). Some proteins serve to provide structure to the cells while other proteins such as enzymes enable cells to function by acting as catalysts of chemical processes (Nelson and Cox, 2000). 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. *"Although animals ingest many large and complex molecules, they are always broken down*

into the same set of smaller components before they enter into the metabolic processes of the cells. (Capra, 2002).*"* Since all cells only use the same set or alphabet of small molecules one could say that all cells utilize the same **chemical code**.

- 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**.
- Because the body only uses a specific group of organic molecules such as DNA, RNA, enzymes, certain amino acids etc. in its biological processes, a **frequency code** is built into the system, where only electrical frequencies**, which exactly match the resonant frequency** of these molecules, are absorbed.
- This frequency code also includes more complex structures such as cell components that are assembled in cooperative arrays as well as different cell types. All human bodies contain numerous types of cells. Some cells are specialized like heart or kidney cells. Each cell type also has its own characteristic resonant frequency. The cell membrane is the primary site of interaction between electric fields and the cell (Adey, 1993a).
- 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.
- Living organisms are composed of organic molecules that have **liquid crystal properties.** Liquid crystals are intermediate forms or phases of matter that exhibit properties of both liquids and solids (Collings, 1990).
- Intracellular and extracellular biological liquid crystal molecules inherently possess the property of resonance according to the laws of physics. Biological molecules, atoms and even electrons have special resonant frequencies that will only be excited by energies of very precise vibratory characteristics. When two oscillators are tuned to the same identical frequency the emission of one will cause the other to respond to the signal and begin to vibrate. 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. These regulatory processes are usually defined in biochemistry 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**.
- 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). Researchers such as Ross Adey and other have discovered that 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).
- The principle of electromagnetic coupling allows the capability of eliciting specific biological responses when the proper frequency code has been deciphered. Application of the proper frequency code makes it possible to signal the body to perform a biological function such as the transport of fatty acids into mitochondria so that the fatty acids can be burned to produce energy.
- In order for LifeWave patches to be able to influence chemical reactions in the body, such as converting fats into energy without placing chemicals into the body the patches have been designed to deliver specific electrical fields into the body that exactly lie within **certain permitted windows**. This is done in the LIFEWAVE patches by using orthomolecular organic substances that exactly match some of the molecules involved in the regulation of energy production from fat and the release of calcium in muscle cells. The natural substances in the LIFEWAVE patches in a sense act as a transmitter of a specific set of electrical frequencies when the patches interact with the body's magnetic field.

The evidence that shows the body has a magnetic field

- Through the use of a piece of equipment called a SQUID (Superconducting Quantum Interference Device) magnetometer scientists have now objectively proven that there is 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, however the laws of physics require that the generation of an electrical current always results in the production of a corresponding magnetic field in the

surrounding space. A 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. When this natural electrical current flows in the body a weak magnetic field is also produced outside of the body (Rottier, 2000).
- Even though scientists and practitioners for centuries have used simple electronic equipment to measure electrical fields that are present on the skin. The detection of the magnetic component had to wait until 1963 when researchers at Syracuse University first measured the magnetic field produced by the heart, which is one-millionth the strength of the earth's magnetic field (Baule et al., 1963).
- In 1971, equipment sensitive enough to measure the brain's weak biomagnetic field, which is even 100 times weaker than the heart's magnetic field, was developed (Cohen, 1972).
- LifeWave patch technology has been designed to deliver certain specific resonant frequencies into the body by utilizing a passive transmitter system. The pulsating magnetic field of the body acts as a high frequency carrier wave that is **frequency modulated** by the ingredients in the LIFEWAVE patches.

Absorption of electromagnetic energy by biological molecules

- Biological molecules can absorb energy at specific discrete frequencies in the form of energy packets or quanta. This is based on the physics principle of resonance where each quantum transfers energy to the molecules in proportion to the specific frequency of that quantum (Heynick, 1987). 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.
- Quantum energy absorption is essentially a microscopic phenomenon where the **chemical composition and molecular configuration** of the molecules in a cell determine the specific frequencies or characteristic spectra where such absorption can occur (Heynick, 1987).
- According to Louis Heynik, low energy frequencies can change the orientations and **configurations of molecules** without altering or destroying the basic identities of the molecules (Heynick, 1987).
- *"Indeed, **cooperative interactions** occur among subunits of molecules within biological cells, in membranes and other cellular structures, and in extracellular fluids; in such interactions, the energy absorbed at one specific site in a structure (in a membrane or in a biological macromolecule, for example) may not be sufficient to disrupt a bond **but could alter a process at the site or elsewhere in the structure, or trigger a function of the structure as a whole by release of the energy stored in the structure, thereby producing biological amplification of the incident quantum of energy*** (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 effect.
- The key conceptual problems that must be addressed in order to use electromagnetic frequencies to activate biological processes are: a) identifying the molecules/proteins/ enzymes/reactants that are involved in the metabolic reactions you want to influence. This can be accomplished by studying biochemistry texts that describe biochemical reactions; b) identifying the specific electromagnetic frequencies that can produce resonance in these molecules so that activation of the biochemical process is enhanced. This can be accomplished by studying physics textbooks that describe the absorption spectra of different molecules; c) developing an effective delivery system to efficiently transfer these frequencies into the body. This requires research and experimentation.
- LifeWave patch technology has over come these conceptual barriers by formulating mixtures of orthomolecular organic chiral molecules specific for certain biochemical processes. The interaction of the natural molecules contained within the patches with the body's thermomagnetic field produces a specific set of oscillating electrical signals that are transmitted into the body just like radio signals are sent from a transmitter to millions of home radios (receivers). Molecules that are already pretuned to the frequencies being transmitted receive these specific electrical signals. When the frequency specific energy is absorbed by these molecules activation of biochemical reactions that are already naturally occurring can be enhanced.

How are these electrical signals transmitted into the body?
One method is Frequency Modulation

- Radio and television waves are electromagnetic waves that are generated by the production of oscillating electrical charges (Jones and Childers, 1990).
- All radio and television stations in the United States are assigned a specific broadcast frequency by the Federal Communications Commission (FCC).
- The frequency that radio and television stations always broadcast on is known as **the carrier wave** and is the frequency that a person tunes into on their radio or TV (Jones and Childers, 1990).
- It has been known for over a hundred years that a carrier wave can be used to piggyback other waves, which are known as the signal waves. The **signal waves** carry the information that is being transmitted such as sound or pictures (Carr, 2001).
- The superimposition of a signal wave on a carrier wave is known as **modulation**. Modulation can be accomplished either by either modulating the amplitude or the frequency of the carrier wave by the information signal (Jones and Childers, 1990).
- Proper operation of such as system requires a transmitter that sends out the combined carrier and signal waves and a receiver that contains a tuning circuit that can be set to resonate at the correct frequency. The reception of the broadcast signal **induces a small voltage in the receiving antenna**. When the signal that is

transmitted matches the tuner frequency it then passes through the tuning circuit to be amplified.

- 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 antennas (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 electrical 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 cells of the body contain electrical circuits that allow electricity and information that is carried by the frequencies of electrical signals to pass into and out of the cells. Cells also containing tuning circuits composed of membrane, membrane receptors and cytoskeletal protein complexes that allow detection, resonant absorption and amplification of very specific electrical 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 antennas/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.
- Voltage changes in cell membranes are believed to drive protein-based motors located in the lateral cell wall of outer hair cells in the cochlea of the ear (Santos-Sacchi and Dilger, 1988; Holley and Ashmore, 1990; Hallworth et al., 1993). Protein based motors are also located in muscle fibers, mitochondrial membranes and other locations in the body (Rayment et al., 1993, Spudich, 1994; Neupert and Brunner, 2002).
- Numerous writers such as Fritjof Capra have noted that nature conserves mechanisms that work (Capra, 2002). In my opinion electrical forces such as voltage changes in cell membranes and inward current flows may in fact drive all of the protein/enzyme-based motors in the body. I base this opinion on the fact that an inward current is known to exist between the cell membrane and other cell structures such as the mitochondria and DNA (Garnett, 1998). In addition electrical currents can enter the cell through ion channels in the cell membrane that act as electrical rectifiers resulting in the entry of minerals such as potassium or calcium, which produces a signal amplifying effect (Nicholls et al., 2001). Some of the electrical charges that compose these inward electrical currents travel through an intracellular oscillating biological electrical circuit composed of liquid crystal semiconducting proteins of the cells cytoskeleton (Oschman, 2000).
- The interior of every cell is composed of an integrative structure composed of cytoskeletal proteins that have been shown to form hardwire connections between the cell membrane and the DNA and the mitochondria. The fact that these liquid crystal cytoskeletal proteins also possess semiconducting properties allows them

to transfer charges (current) from the cell membrane to internal structures like DNA and the mitochondria. The cytoskeleton of cells in a sense hardwires all of the components of the cell into a solid-state biological computer.

Resonant energy transfer and the concept of cellular radio

- Those of you who are old enough may remember the famous Memorex tape commercial where Ella Fitzgerald broke a glass by singing certain notes. The makers of Memorex tapes recorded and amplified Ms. Fitzgerald while she was singing. This commercial was made to show that the recording quality of Memorex tape was so good that playing the tape also broke the glass. The tag line was: **Is it live or is it Memorex?**
- The reason this commercial worked is because Ella Fitzgerald was able to sing in perfect pitch with the natural frequency of vibration of the glass. When she sang the same note as the natural resonant frequency of the glass the sound waves produced by her voice caused the glass to begin vibrating till it shattered. This is an example of resonant energy transfer by using sound waves. Technically it is called forced oscillation resonance.
- The phenomena of resonance energy transfer can also be demonstrated by using two 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**.
- When something has a natural rate of vibration you can actually pump in more energy if you apply the same frequency. You can also use this same concept in electronic equipment to wirelessly transfer information from one place to another. Now from the point of view of LIFEWAVE patches the idea is not to try and break glasses with sound waves. Instead the patches interact with the body's magnetic field to produce **specific electrical frequencies** that **resonantly transfer energy** to turn on certain chemical processes in the body such as accelerating the body's ability to burn fat as a fuel source for energy.
- LifeWave patches contain a unique formulation of certain specific natural organic chemicals. The natural materials in these patches are designed to interact with the natural oscillating magnetic field of the body. This interaction produces certain specific electrical frequencies or signals that are then carried into the body by the magnetic field of the body similar to how a radio signal is transmitted from a radio station.
- The electrical frequencies produced by the interaction of the patch materials with the body's natural magnetic field are modulated or tuned to certain molecules and molecular structures in the body in much the same way that car radios can be tuned to the waves of a particular radio station to receive and produce sounds. I like to call this feature of the patches **cellular radio**.
- The materials in the patches have been specially selected to match the resonant frequency of certain molecules in the body that are involved in burning fats (fat metabolism). So when the patches are used the body will increase its use of fats as an energy source. This translates into more energy, greater stamina and better performance.

- Since the body obtains over twice as much energy from burning fats than it does from burning sugars, a person who uses these patches will find that they have more endurance.
- Lets give an example of obtaining energy from fats as opposed to obtaining energy from sugars. Lets imagine it is a cold winter night and you are camping out in a cabin that does not have electricity, but you do have a fireplace, a stack of old newspapers and a pile of oak logs. The newspapers represent burning sugars and the oak logs represent burning fats. You can start the fire with the newspapers/sugars, but you get very little sustained heat/energy unless you sit there all night and continually feed newspapers into the fire. However if you throw in some of the oak logs/fats you can create a nice hot fire that will put out energy for hours because the oak logs/fat contain a lot more useable energy than does a pile of newspapers/sugars. If you burn logs you can get under the covers and sleep through the night all warm and toasty. If you decide to just use the newspapers you stay up all night feeding the fire and you don't get any sleep.
- Our mission is to help your body, which is like a fireplace, burn oak logs/fats instead of newspapers/sugars so that you have more energy.
- LIFEWAVE patches are indicated for individuals who like to exercise, participate in sports or just want more energy at the end of the day.

LIFEWAVE patches are like organic radio stations

- One analogy that may help you understand how LifeWave patches work is to think of them as being like **organic radio stations**. Lets say you own a radio station. Your radio station will have to be licensed by the federal government to send out a specific frequency called a carrier wave across the airwaves. The carrier wave that your radio station transmits is used to carry or piggyback other frequencies that contain information signals. If you are licensed to run an FM radio station your equipment will use frequency modulation to encode information on the carrier wave that your station transmits. In order for the radios in people's homes to receive your radio transmission their radios have to be tuned to carrier wave of your radio station so that they can demodulate the information signals.
- Your radio station will use an active transmitter that derives energy from electricity to send out electromagnetic frequencies that lie in a particular portion of the electromagnetic spectra we call radio waves. Before you begin operation of your radio station you are first going to have to decide what information you want your radio station to transmit. If you choose to send information that nobody wants to listen to you will soon be out of business. Therefore, you have to be very selective in the information that you transmit. If a signal is sent from one place and received at another place then information has been successfully transmitted and received.
- Just as the mayor of a city can get on your radio station and tell the citizens that the community has a blood shortage. Those people who respond to the information they received on their radios can then go to the Red Cross and donate blood. What we have is the phenomenon where information has been transmitted from one place to another and a response occurs.

- LifeWave patch technology was invented with the recognition that the body is composed of molecules and that each chemical reaction in the body uses very specific combinations of molecules and that these molecules will respond to specific frequency signals or codes. In general molecules in the body are not isolated substances dissolved in the fluid of cells instead molecules link to other molecules to form more complex structures.
- Every molecule and molecular complex of the body is like the glass in the Memorex commercial. Each molecule and molecular complex has its own specific frequency at which it can resonantly absorb information or energy. In a sense these molecular structures are like a miniature radio receivers. When information is sent at the frequency code that these molecular radios are pretuned to receive, information or energy can be directly transmitted to those molecules in the body. This process of energy transfer to specific molecular complexes can assist in the activation of the chemical reactions these molecules are involved in.
- LifeWave patches were designed to function as passive transmitter systems. When the patches are placed on the skin the materials in the patches interact with and modulate body's magnetic field to produce certain specific electrical signals. In addition the body's natural magnetic field is the carrier that takes these signals into the body.
- LifeWave patch technology does not create chemical reactions in the body it only assists biological reactions that are already taking place to work more efficiently. David Schmidt has basically investigated what signals are needed to turn on certain biological reactions and invented a patch technology that can effectively deliver these signals into the body.
- In summary, LIFEWAVE patches contain organic molecules that are naturally present in the human body. These substances have already been determined to be safe by the FDA. However instead of actually putting the molecules themselves into the body LIFEWAVE patches produce specific electrical signals, which will be resonantly absorbed by molecules that are able to receive these particular signals.

Data supporting the concept that cell components can respond to external frequencies with metabolic changes

- In order for an electromagnetic field to activate a metabolic process in the body a **field induced molecular change must occur**. This section will discuss the physical, chemical and electrical properties of proteins and how electrical fields can affect the molecular structures and functions of proteins. *"It is at the atomic level that physical processes, rather than chemical reactions in the fabric of molecules, appear to shape the transfer of energy and the flow of signals in living systems* (Adey, 1993a)*."*
- Proteins are sophisticated molecules that play critical structural and functional roles in the cells. Proteins help provide cell structure, strength and flexibility. Proteins also have functional roles as signaling molecules in the processes of cell communication and as enzymes in the chemical reactions of cells. The functional properties of proteins in turn are dependent upon their three-dimensional structure (Grattarola et al., 1998).

- Proteins that catalyze chemical reactions are called enzymes (Holyzclaw et al., 1991). **The body's enzymes** are natural catalytic molecules that promote chemical reactions without themselves being used up. Enzymes are specific for certain chemical substances because they recognize specific chemical structures both by their **three-dimensional shape** as well as by their chemical properties (Jespersen, 1997).
- Proteins embedded in cell membranes that act as signal devices are called receptors. Receptors respond to chemical signals from the blood stream to initiate chemical pathways within the cells and to assist in the transport of materials into and out of cells (Nelson and Cox, 2000). The scientific data also shows that receptors also respond to electric fields (Adey, 1993a).
- Enzymes and membrane receptors, like all proteins, are folded into 3-dimensional structures. The primary 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).
- The location and sequence of amino acids, the location and sequence of negative and positive charges, and the interaction of the protein with water and other biological molecules determines the primary three-dimensional structure of a protein at body pH (Grattarola et al., 1998; Nelson and Cox, 2000).
- Linus Pauling was the first scientist to discover that specific sequences of amino acids in a protein **can coil** or **wind itself and then transition into a helical shape** called an alpha-helix (Pauling, 1988). This structure is particularly prominent in proteins that are embedded in cell membranes (Nelson and Cox, 2000).
- In electrical terms coils and helices are inductors, transducers and antennas.
- The coil-to helix transition is a nonlinear phenomenon (Grattarola et al., 1998), which means that it can be triggered by absolutely miniscule amounts of energy.
- The coil-to helix transition is a cooperative phenomenon **called a two-state function,** which is characteristic of any type of electronic or biological device appropriate for **information processing** (Grattarola et al., 1998).
- Enzymes and receptors are types of proteins that 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 position. 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).
- For many years biologists have recognized that the triggering mechanism that turns on enzymes and receptors causing them to transition between their active and rest states involves chemical interactions where chemical compounds transfer electrical charges between one another. However new research has now proven that the transfer of electric charges does not always require a chemical carrier. In fact enzymes and receptors can also 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).

- A number of researchers, especially Ross Adey, 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 essential molecular functions appear in fact to be determined by electromagnetic mechanisms. A possible role of molecular structures would be the carrying of electric charges, which generate, in the aqueous environment, a field specific to each molecule. Those exhibiting such coresonating or opposed fields ("electroconformational coupling") **could thus communicate, even at a distance*** (Benveniste, 1993).*"*
- For example, it is well recognized by biologists that cell enzymes such as Na,K-ATPases require energy to pump ions such as sodium and potassium across cell membranes. However new data shows that these enzymes can either be activated by chemical energy derived from ATP or by energy directly absorbed from electric fields (Xie et al., 1997). In this case energy from the electric field substitutes for the energy normally provided chemically by ATP (Derényi and Astumian, 1998). Any electromagnetic effect on a chemically based biological reaction in the body is dependent upon the electric or magnetic **frequency sensitivity** of the rate constant of the enzyme involved in the chemical reaction (Weaver et al., 2000). Membrane receptor proteins can also be activated by resonantly coupling to electric fields (Astumian and Robertson, 1989).
- *"If fields can affect enzymes and cells, [one should expect] **to be able to tailor a waveform as a therapeutic agent** in much the same way as one now modulates chemical structures to obtain pharmacological selectivity and perhaps withhold many of the side-effects common to pharmaceutical substances* (Davey and Kell, 1990).*"*
- 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. This is exactly how LifeWave patches work.

Biological Antennas

- Their shapes can classify antennas, and their shape determines their radiation pattern. Antennas emit power that is different at different angles (Carr, 2001).

- The cells of the body communicate with each other by chemical signal molecules that are either carried by the bloodstream to cells in distant locations or are released directly on the cell surfaces from nerve fibers and local tissue cells (Nicholls et al., 2001).
- The binding of a signaling chemical to a cell membrane receptor triggers an **amplified biological response** such as the opening of a cell membrane ion channel, which allows the entry of minerals like calcium into the cell. Other amplified responses include the activation of enzymes and secondary messenger signals (Mehrvar et al., 2000).
- It is not widely known, but cell membrane receptors can also act like electrical antennas and transducers responding to signals of electrical fields of the right frequency and amplitude (Adey, 1993a, 1993b).
- Cell membrane receptors composed of proteins that have coil and helical configurations can act as receiving antennas for electrical fields as well as electrical transducers and electrical inductors. These components are organized into complex cooperative arrays that facilitate communication (signaling and information transfer) between cells in the body as well as between cells and the external environment (Gilman, 1987). The transducing element in cell membrane biosensor complexes couples a chemical or electrical signal to a biological response that might include the movement of minerals into the cell or a cascade of enzyme reactions (Mehrvar et al., 2000).
- Helical antennas produce directed beams when their diameter and coil spacing are large fractions of the wavelength. They provide moderately wide bandwidth and circular polarized beams (Carr, 2001). When helical antennas are used the receiving helical antenna has to be wound in the same direction as the sender's. Helical antennas, like DNA, can be stacked, which allows a way for a ell receptor/antenna to obtain high gain with only a few turns on each helix.
- In summary it is my opinion that the structures of cells have components that have electronic features allowing cells to detect and respond to electrical frequencies that act as information signals triggering biological responses through the process of **signal amplification**.

The mechanism of resonant electrical frequency interactions with cells

- The mechanism of resonant electrical frequency interactions with cells includes the reception of the electrical signal/charge transfer by receptor **antenna/transducers** that are coupled to membrane bound G-proteins that are also coupled to intracellular enzymes like adenylate cyclase.
- Membrane bound G-proteins and the intracellular enzymes that they are coupled to form a complex of proteins that operate as an **amplifier** for the signal they receive. For example certain G-proteins are coupled to and activate specific intracellular enzymes that in turn increase the cell concentrations of second messenger systems like cAMP. Increasing cell levels of cAMP in turn activates an enzyme called protein kinase A, which in turn activates other enzymes such as hormone sensitive lipase (Nelson and Cox, 2000; Nicholls et al., 2001).

- Different electrical frequencies will activate different receptors, different G-proteins, different intracellular enzymes and different second messenger systems thus producing different biological reactions and cascades.
- Certain steps must be taken in order for a clinician to be able to electrically modulate the biological reactions he or she wants to influence. He or she **must first identify, choose, and apply the correct electrical frequencies** that activate the signaling mechanism involved in turning on that biological process. In addition an individual who makes an effort to improve the health of their **cell membranes** by proper modification of the diet with food and or supplements may receive even greater benefits from this technology.

The principle of magnetic induction

- In 1831 Michael Faraday, one of the first electrical pioneers, first described the phenomenon of **electromagnetic induction**. He discovered that he could produce a measurable electrical current in a wire conductor simply by moving a magnet near the wire. This discovery became the basis for Faraday's Law of Induction, which is a basic law of electromagnetism (Jones and Childers, 1990).
- The LifeWave patch system has been designed to utilize the principle of induction. The natural substances in these patches are in a sense function as small electronic conductors and antennas. When the body's oscillating magnetic field interacts with these electrically active molecules in the patches, the magnetic field induces the creation of electric fields through the Faraday effect. The electrical field produced contains the specific resonant frequencies of the materials contained within the patches. The electromagnetic field that is naturally present in addition acts like a transmitter of a carrier wave so that these frequencies can be carried into the body.
- The interaction of the body's magnetic field with LifeWave patches induces electrical 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. This technology can support: the use of fat as an energy source, the activation of muscle contraction by calcium, which increases the recruitment of muscle fibers. This translates into more energy and greater endurance.

How LIFEWAVE patches interface with the body's thermomagnetic field, the transformer analogy

- A transformer is a device that transfers electrical energy from one electric circuit to another, by the principle of magnetic induction **without changing the frequency.**
- A transformer has two windings or coils the first called the primary winding is the coil that draws power/ or frequency from the source. The secondary winding is the coil that delivers the energy to the load. Magnetic transfer of voltage or frequencies only occurs if the magnetic field is oscillating/changing strength (Van Valkenburgh, Nooger and Neville, Inc., 1992).
- An **isolation transformer** is a special transformer that is designed so that the signal going out equals the signal going in. In LifeWave technology the signal

going out is produced by the interaction of the body's fluctuating thermomagnetic field with the antenna/conductor created by the organic matrix of the patch.

- The unique proprietary mixture of Life Wave technology LIFEWAVE patches forms a matrix antenna/conductor system that acts like a **primary coil of a transformer** when it interacts with the body's magnetic field.
- The oscillating thermomagnetic field of the body creates **magnetic induction** where the electrical frequencies generated from the materials in the patch **frequency modulate** the body's oscillating magnetic field.
- The interaction of the patches with the body's oscillating magnetic field creates local vortexes in the magnetic field over the area where the patches are located. The magnetic field is thus modulated by this interaction with the patches and it acts as an information carrier of **a harmonic electrical energy field**.
- The resonant interaction of the electrical signals with molecules that are already pretuned to the exact frequencies allows information to be passed to the receiving molecules.
- Receiving molecules in cell membranes and the cell function like the **secondary windings of a transformer**. These cellular components function as antennas, electrical transducers and electrical inductors so that the cell demodulates and receives the signal information by resonant energy transfer. Resonant absorption of electrical frequencies by biological molecules results in the **induction of electron flows** in the conductive liquid crystal molecules of the body.
- The resonant transfer of specific frequency information to the cells is amplified by cellular mechanisms and this information can activate or enhance certain specific biological processes that can be selected for activation by the choice of materials placed in the patches to provide a specific set of electrical frequencies.
- For example, use of natural organic materials such as chiral L-amino acids in the patches permits the production of electrical fields whose frequencies exactly match the resonant frequencies of certain specific natural biological molecules.

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