

# **BioCoherence and Lifewave Energy Enhancement Patches**

## **Utilizing Bionetic-Feedback Assessment**

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### **Abstract**

BioCoherence Analysis (BCA) is an emerging complex science that records and analyzes unique bioelectrical information from the body by measuring micro-voltage readings detected on the skin's surface. The bioelectrical information is converted mathematically through specific algorithms through FFT analysis which specifically extracts meaningful information from within the core data isolated by specialized SsEMG equipment at specific and unique bandwidths. The basic filter for the tests and the measurements specifically isolated frequency information data for this paper, were within the 0-10 Hz range. The dynamic ranges (seven total) within that 0-10 Hz bandwidth were extracted by analyzing known frequencies of the "standing waves" which are generated from cellular activity deep within the body's connective tissue matrix, and which are supported through Bionetic research regarding specific data from the connective tissue or Tensegrity Matrix (Ingber), which reflects specific energy flows and distribution of energy exchange within the organism. Such transference is carried on in the 0-10 Hz range of the human body constantly, representing aspects of cerebral spinal fluid activity, neural plexus interfaces and Bionetic data.

The data is analyzed mathematically to assess the characterization of each of the wave potentials. The process of measurement and wave analysis is termed BioCoherence Analysis. The overall characteristics of each of the standing waves can then be plotted and graphed. By various internal and external influences, the Standing Waves can be modified. Such modification, however, is quite difficult to accomplish and still keep 'coherence' at a high level. Changes in the tonic standing waves can be analyzed after evoked potentials in phasic states, and are then measured and noted using BioCoherence data analysis. Although standing waves in particular are very difficult to

augment or enhance without causing localized disruption, in some unique cases, a type of passive augmentation evoked potential with LifeWave Energy Enhancer Patches it has been found to be quite remarkable in its effect. BCA is an ideal process to analyze passive and active changes in the Standing Wave frequencies in the bandwidth of 0-10 Hz.

## **Overview**

As a unique and emerging science of measurement and analysis of aspects of the connective tissue matrix, BCA combines three sciences: traditional myographic biofeedback, Bionetic feedback, and biophysics. Because BCA is based on decades of sEMG research, it rests on a solid foundation, yet now, due to advances in Bionetic feedback, actual biofeedback data can be analyzed quite differently. Bionetic feedback makes some unique departures from traditional sEMG and thus takes the measurement process into a unique type of diagnostic tool. The departures from traditional biofeedback which are the contributing factors to the key differences in Bionetic Feedback Instrumentation and Analysis which is at the heart of the BioCoherence Analysis include the following: 1) BCA requires extremely sensitive scanning sEMG equipment able to measure the smallest of changes in micro-voltages. 2) The source of the waves being measured is completely different than in traditional applications – it isolates “standing” waves that are generated from deep within the ground substance or biomatrix of the connective tissues. Previously these frequencies have been traditionally believed to be “white noise”. 3) The measurements are recorded while the subject is in a relaxed and meditative state, whereby BCA considers muscle movement as artifact. 4) The frequency range from 0-10,000 KHz is used for spectral analysis and their changes over time. Special filtration is used to determine the zones of coherence. Standing waves include long (low band width), medium (moderate bandwidths 10-55 Hz), and short 60 Hz and higher. Ultra short waves begin at 2k hertz and then can be much higher even to 10Hz. For many of the quoted studies the “long” standing waves found in the 0-10 KHz band width were used.

## **Biofeedback, EMG, and BCA.**

Scanning surface electromyography (SsEMG) has evolved from within the ranks of biometric muscle analysis for over thirty five years. Founded in biofeedback, its history includes years of clinical research and literally thousands of studies conducted by physiologists, psychologists, in the fields of behavior medicine, sports physiology, and physio therapy. As a science it is further supported by several decades of research conducted by the US Veterans Administration, neurological biomedical research and a host of other disciplines. SsEMG, was developed years ago serving specific aspects of clinical physiology and biofeedback needs. Also many private companies and individuals ascertained its value beginning in the 1970's.

In traditional EMG applications, the frequencies containing the standing wave potentials which, prior to the advent of BCA have been considered as internal or environmental artifact or white noise, were marked for elimination, yet now, through BCA, they are carefully extracted with sensitive sensing technology. Standing waves may have been generally grouped into white noise until this last decade due to the increased quality of equipment design with unique internal filtering components. Special care and attention is given in the equipment design phase, in order to completely eliminate any white noise signals generated from the components of the technology so as to completely isolate the standing wave information.

BCA closely examines all frequencies contained within the biomatrix from standing waves and assesses their quality, characteristics, and inter-actions in order to eventually determine their interactions and interfaces with the body. These analyses are part of the Bionetic feedback assessment and analysis segments. Additional information regarding the level of activity, changes in the overall character, such as form, modulation, attenuation and amplitude, or the functions these waves and how they perform within the organism are currently being evaluated through Bionetic Feedback mechanisms. It is anticipated that in time significantly more regarding standing wave characteristics will be uncovered.

## **Data Collection and Measurement**

Scanning Surface Electromyography sEMG used for BCA requires: 1) extremely sensitive scanning sEMG equipment able to measure the smallest of changes in micro-voltages. 2) The source of the waves being measured is completely different than in traditional applications – it isolates “standing” waves that are generated from deep within the ground substance or biomatrix of the connective tissues. 3) The measurements are recorded while the subject is in a relaxed and meditative state, whereby BCA considers muscle movement as artifact. 4) The frequency range from 0-20,000 KHz is used for spectral analysis and their changes over time; however, many of the quoted studies have centered on the “long” standing waves found in the 0-10 KHz band width. All four of these departures are areas which have been disregarded in traditional sEMG applications.

## **Preliminary Uses**

Although all research is in preliminary stages, with a few studies currently under way, initial findings show that the data is extremely promising and BCA is an effective modality. Additionally, from a traditional sEMG application versus those in BCA either sEMG or Scanning EMG data is desirable, yet BCA regards as most significant. Bionetic feedback makes significant posits toward integrated understandings between Eastern and Western thought.

## **Bionetic Analysis**

The aspects of Bionetic’s analysis and its departures from traditional biofeedback include the following:

- 1) Unique frequencies and evoked potentials are studied,

2) Relationships of those frequencies to known biophysics parameters enabled with the advent of sophisticated computer programs provide complex data analysis.

3) Most notably, the relationship to other body systems as surmised by Eastern thought are concepts known through Bionetics and are sought to be proven.

4). Frequencies include 0-10,000 Hz. They can be analyzed in either spectral domains or harmonic domains in either simple or complex wave analyses.

5) The origination and information regarding the generating source[s] and purposes of the frequencies of the standing waves.

6) Within the scope of this paper, all muscle activity is considered as artifact.

7) Similarly to traditional biofeedback, standard filtrations for aberrant frequencies are still taken into account, and significant steps are taken to produce the highest fidelity of these potentials in order to provide smooth and clear signal potentials is paramount in BCA, however, as stated herein, the frequency ranges are not “typical.”

8) The scanning sEMG data collection is not used for the traditional application of measuring micro-voltage phase amplitude shifts for muscle movements; i.e., 180-250 KHz. Traditional scanning EMG assesses muscle activity and filters out Ground Substance Noise treating it as artifact. BCA isolates Ground Substance waves and filters out Muscle Movement, treating it as artifact.

## **The Algorithms**

The mathematical algorithms used in Bionetics for the analysis of the voltage potentials from the standing waves, consists of quantitative and qualitative analysis as well as certain mathematical vector arrays, post data analysis through FFT mathematics, time to frequency domain analysis, and pre and post intervention data comparison. The

reports generated from the standing wave potential analysis in BioCoherence studies verify unique and complex relationships of the wavelength relationships within the ground substance. There is valuable information contained in the analysis of these waves—not only in their configurations and characteristics but in their quality and inter-relationship with the whole organism. These standing waves are a common characteristic of all living organisms; they are an indication of life itself. Subsequent findings have also shown these wave potentials to be similar in horses, and dogs. These waves are also malleable to a certain extent, and they can be influenced both in positive and negative directions, by a phase-shift, from cold laser, electromagnetic energy, sound, vibrations, and electro-acupuncture. The fact that these waves are homeodynamic, plus malleable denotes that through BCA, the data readily demonstrates the properties of physics within organisms pertaining to energy flow and utilization, redistribution, storage, and absorption (Ho, 1998).

Due to the ability to have complex wave form analysis provided by computer, and in relying on the fact that hundreds of tests have been performed, inroads have also been made regarding BCA as a significant contributor in pre and post intervention evaluation. BCA opens the scientific research community to a new type of analysis tool providing the most critical scientific measurements of subtle changes made within the body's ground substance or biomatrix, and in aiding in the determination of both positive and negative effects interventions have on the body.

The standing wave characteristics demonstrate unique energetic blueprints of the energy bands nexus at neural plexus, but also characterize specific bioelectrical properties within the biomatrix substrates which can be quantified and categorized based on spectral analysis. Many of the test subjects found collaboration in symptoms matching them empirically with the data, just upon asking them. For the most part, the data correlates beyond the basic “energy phase shift” analysis required for LifeWave Energy Patches, was also corroborated.

## **Assumptions**

Some bioenergetic correlates are assumed regarding the relationship of these waves with particular organs, glands or functions of the body, and direct correlations have yet to be scientifically proven; however, certain assumptions have been made based on relevant data from various spectral data and molecule to frequency conversions, as well as electric sources which form the beginning hypotheses in order to posit underlying bioenergetic meaning and interpretation of relationships of the data. Any references regarding specific organ or gland nomenclature is not intended to be diagnostic of that particular organ or tissue substrate, nor is it diagnostic in any manner, but the labels are used merely to offer some simplicity to complex wave relationships and to offer a basic premise of assessment in order to make interpretations of the data understandable from a bioenergetic perspective. Subsequent testing will prove or disprove these underlying assumptions.

## **Preliminary Findings**

After testing several hundreds of subjects, the preliminary findings confirm not only that BCA is an effective measurement and assessment tool for the observation of the bioelectrical activity within the biomatrix, (biofield) but also, due to a much higher than normal repeatability factor of over 96%, it provides an effective means of evaluation of BioField interventions measuring changes in physiology caused by exogenous factors introduced to the body which affect BioField data. By measuring shifts in exogenous responses (pre) tonic and post (phasic) intervention data can be recorded and analyzed. Additionally, BCA effectively models biophysical data further supporting the basic premises of the subtle energy theories, supported through physiological readings and biofeedback responses which verify principles of energy exchanges and Eastern thought in areas such as The Chinese Five Element Theory. Such responses easily demonstrate BioField activities within the human organism and the malleability of BioField energies. The overall effect of energetic interventions that affect the BioField of the body can now be accurately measured and evaluated. The BCA testing method

meets all scientific requirements for successful research and product development in regard to a viable biophysical interface and bioenergetic interventions and their effect on the human energy field. BCA uniquely inter-joins the field of Biofeedback, Bionetic Feedback and Physics into a common measuring and assessment technology that is extremely effective for ongoing scientific research and analysis.

## **Background**

### **SEMG**

Surface Electromyography (sEMG) is a non-invasive biofeedback assessment used to measure muscle activity. Changes within the muscle fibers during the phases of contraction and relaxation show respective increases and decreases in micro-voltage potentials which are measured across the skin's surface. Isolation of these micro shift potentials electronically requires the use of specialized surface electrodes that are sensitive enough to assess closely adjacent muscle activity as these voltage potentials pass through the dermal layers up to the skin's surface. Due to its relative ease of use and non-invasive process, sEMG has been used for the assessment of muscle tension, stress, and muscle contraction/relaxation for smaller muscle groups that have become unknowingly tensed by the patient during times of stress.

Prolonged tensing of small muscle groups leads to complications beyond isolated pain, causing long-term muscle fatigue, Bruxism, TMJ, insomnia, and general overall fatigue; additionally sEMG has been utilized to isolate longer muscles for the aid of muscle training, soft tissue damage, and dynamic phase responses. However, in the past, there have been limitations due to electrode sensitivity and electrode placement necessary to eliminate noise and artifact from the measuring methods in long muscle frequency isolation due to complications of frequencies arising from electrical white noise, or frequencies generated from the ground state.

Historically EMG has been used to isolate actions of particular long muscles using concentric needle recording electrodes directly inserted into the muscle fibers through the skin via a steel cannula exterior with insulated micro connecting wires of silver or platinum inside, which are exposed to the tissues at the tip. The potential difference between the outer cannula and the inner wire is recorded and the patient is grounded with a separate surface electrode; however, due to its invasive nature, and the increase in quality of surface electrodes, its popularity has decreased except in neuromuscular diagnosis of motor units of the muscle fibers and nerve conjunction studies.

### **Potential and Micro Voltages**

Flexure of the muscles caused by the motor nerves and changes in cross potentials of the muscle tissues create a dielectric change within the tissues themselves creating a contraction through mobilization of calcium, generating frequency amplitudes. Even though both the heart and the brain show distinct electrical wave patterns, if the reference electrodes are significantly far away from the heart or brain, it is easy to filter out any extraneous potential from them, and solely isolate muscle activity.

The traditional measuring method for sEMG micro-voltage signals is accomplished through the use of two small surface electrodes that are placed on the skin above the desired muscle - typically two to three inches apart. The electrodes are attached to a wire that is connected to the measuring instrument and the signal is amplified and then filtered with a band-pass filter to eliminate noise, and a Variable Gain Amplifier in the instrument is used which boosts the myological data being generated from beneath the skin as it passes through the localized tissues. A grounding or differential electrode is also placed on the skin at a remote site. The mvological readings are then sent to a computer display and then changed to a graphed format showing the frequency band amplitudes generated from the muscle movement (typically 20-200 KHz during contraction. The measurement is recorded and as the muscle relaxes these frequency amplitudes return to their base frequency amplitude – relative zero. In the case where

relative zero is above specific resting frequency amplitude, the patient is then taught to isolate the muscle group, and learn to flex and relax it for greater awareness.

Due to the nature of the small amount of micro-voltages on the skin, isolation of the frequencies and fidelity of the signals becomes paramount. Variables include electrode sensitivity and the placement of the electrodes in relation to the muscles to be tested. Reference electrode placement, aberrant noise or interference must be isolated and filtered to have a clean signal, and the assessment of artifact from ambient exogenous frequencies (typically 60 cycle frequencies generated from the electrical wiring from the fixtures in the room) and white noise emanating from within the body must also be filtered out.

Known frequencies from ambient electrical circuits or noise from within the instrument itself must be isolated and either filtered or eliminated so that no extraneous frequencies are mixed into the data sample. Modern engineering techniques, clearer electrical components, and various methods of noise dampening allow for greater signal fidelity which has enabled significant information to be gathered from low noise centers in the ground state, opening a window to new concepts in the methodology of sEMG data.

Electrodes may also demonstrate a type of impedance to the flow of electrical current and it is necessary to have an amplifier of the signal which has a high input impedance to prevent loss of the signal. It is also important that the amplifier have a comprehensive frequency response range of extremely low 1-10 Hz including up to 10,000 Hz or higher to facilitate a uniform spectrum of frequency enhancement. Also, additional filters may be required to isolate interference signals out of the reference signals or to alter the frequency assessed. Filters can include variable resistance capacitance circuits which allow the elimination of unwanted frequencies from those potentials desired for study.

EMG muscle signal analysis, rooted in biofeedback applications, became pronounced in the 1970's with its utilization in traditional biofeedback therapies and the advent of

surface electrode development. Instrumentation had hampered its success due to significant loss in signal fidelity due to inability to filter out noise. As a modality sEMG is validated with significant research data even expanding its applications today to include a broad range of usages and methodologies and biofeedback applications for muscle relaxation, entrainment, muscle tone, soft tissue damage, muscle dynamics such as range of motion, and patient awareness to gain muscle control such as vaginal or anal muscles and for bladder control, however, a complete synopsis of the multiplicity of sEMG applications will not be addressed in this article.

New applications in neo-feedback assessment protocols such as Bionetic feedback have determined that even though there is micro-voltage created at the time of muscle flexure, and that wave theory regarding imbedded frequencies found in sEMG measurements have been typically filtered out so as to isolate the primary voltage frequency ranges 120-200 kHz as a picture of muscle activity, various harmonic frequencies can be isolated within the imbedded standing waves found within what had originally been deemed as noise.

The assessment which is termed BioCoherence is gaining validity and prominence in the neo-biofeedback community. The measurement of standing waves—frequencies that flow within the body matrix, oscillating and traveling in the cytoskeleton and the body itself have begun to peak interest in neofeedback community. Prior to this type of sEMG assessment (BioCoherence), the signals were throwaway or filtered signals and the only frequencies that were used were those created in conjunction with the overall appearance of frequency oscillation created at the time of the muscle(s) flexure – and any extraneous frequencies were filtered out – most notably the non-fidelity frequencies due to electrode placement, ambient noise, and localized exogenous frequencies such as 60 Hz caused by the electrical frequencies of current in the electrical system of the environment. Interestingly, Bionetic feedback considers muscle movement as artifact, although it does filter ambient noise, localized exogenous frequencies at 60 Hz, and also filters frequencies most notably of the 120-200 Hz range as a result of artifact; rather than assessing amplitude of frequencies within the common range for muscle

flexure, BioCoherence assesses all frequencies from 0-58 Hz and 65-2000 kHz (using appropriate notch filters) analyzing the endogenous standing waves, measuring such activity of these waves over time utilizing FFT at various frequency levels assessing the overall harmonics of these waves within the body.

## **BioCoherence Assessment Process**

### **Data Collection**

In the past, assessment (characterization) of the 120-200 Hz muscle waves graphed a frequency bandwidth of amplitudes identifying that the muscle had contracted; due to the sensitivity of the electrodes, micro changes in movements were all measured. If the patient however is asked to recline or relax and the measurement is taken 1) away from the muscle groups 2) with extra-sensitive electrodes, and 3) utilizing signal amplification and or post/data amplification, endogenous waves of the body can be analyzed, and show what we term “standing waves” emanating from the endogenous frequency transmission throughout the body.

With the aid of computer aided analysis critical components of these standing waves, if measured, sampled at 1024 bits per second, and examined with FFT modulation, the characteristics of these waves demonstrates unique characteristics, such as: amplitudes, modulation, signal strengths and comparative relationships regarding phase analysis, average frequency amplitudes and other correlated aspects as they relate to spectral analysis, and harmonics—otherwise known as coherence.

During BioCoherence assessment, millivolts samples from the surface of the skin are taken by the utilization of high surface, re-useable electrodes applied to and attaching them to opposing fingers. Traditionally, each of the index fingers or opposing digits on each of the subject’s right and left hands are used. A differential electrode is applied to one of the subject’s ankles, and in all cases the electrodes must be applied directly to

clean skin. No conducting gel is required. Differential electrodes can be placed anywhere on the body, but the ankle has been used because it was the easiest access for testing purposes. The subject is instructed to remain calm sitting quietly or preferably lying down.

### **Sampling Duration and Repeatability**

There are various length of time options for sampling the micro-voltage, however, it has been determined with SpectraVision technology, (device dependant) that a sample of 30 seconds can make a quick snapshot; however there is not enough data to adequately plot the standing wave characteristics uniformly and in a repeatable manner. Sampling was broken down to three different time segments of: 2.5 minutes, 4.5 minutes, and 8.5 minutes. Preliminary results have shown that for the SpectraVision sampling duration of 2.5 minutes has an overall signal repeatability of approximately 92%, 4.5 minutes, approximately 94%, and 8.5 minutes over a 96% repeatability during subsequent tests.

### **NTA Hardware**

A separate portable scanning EMG unit, was also used to collect the data. The only difference was that the software did not allow “snap-shot” readings. For the most part all tests were conducted using 2.5 (2x) sampling duration with substantially equivalent measuring devices either the SpectraVision or the NTA SsEMG hardware.

### **Wave Analysis**

Thousands of these BioCoherence tests have been performed and the data shows that not only do these standing waves exist and function within the organism, they also have relationships one to another to the degree that denotes a specific type of bioregulation or biodynamic equilibrium which is apparently underlying the interaction of these waves

within the body. Phase shifts can occur based on outside interventions that have the capacity to make changes either to the wave generation, the media of the body, or both. It is apparent that the quality of the ground substance has a direct correlation with the type of waves and their specific characteristics.

The wave characteristics show unique normal ranges for each individual and although these waves can be changed through interventions, typically these waves hold to homeodynamic principles and appear to have a type of regularity or unique character in either single or multiple wave form analysis. The actual variations demonstrated were limited to frequency of modulation, highest amplitude, and overall consistency or coherence.

Resulting data was recorded and analyzed with post reading extrapolations regarding signal strength, amplitude characterization, weighted averaging, attenuation, and overall activity through common signal processing such as fast Fourier wave transform analysis.

Although literally hundreds of frequencies can be assessed through FFT, a unique few have been selected and give particular attention is given to their believed interfaces with neutral plexus, and at frequencies low enough to assess flow of cerebral spinal fluid which has to incorporate ranges less than 70 Hz. In addition to selecting a few pre-set frequencies, specific characteristics have been measured and recorded. Aspects of these wave elements determine the overall characteristics of these standing waves which are the end focus of BioCoherence. Micro wave form analysis, regarding amplitude, maximum and minimum stroke, modulation, phase, and change made to the body or its surrounding environment are measured over time – rather than just measurement of frequencies generated through movement.

## Report of Findings

The data sampling times included over 90% of the tests using 2.5 minutes and only 10% of the tests using a testing time of 4.5 minutes. The variables for sampling duration showed increases in modulations only due to the increase of modulations which were time based and that 3-5 modulations per 2.25 minutes in the selected frequency bandwidths was average. Shorter tests showed consistent readings noting that the highest amplitudes would appear within the first two minutes of the sampling and would also re-appear within the 4.5 minute sample. The characteristics of these long waves differ from short waves, however for our discussion in this paper the measured frequencies were in the 0-10 KHz range.

- Highest amplitudes show ranges between .01 and 5.8.
- Average amplitudes show ranges between .00 and 1.3.
- Modulation ranges for signal strength between 0-13.
- Coherence ranges include a matched number of modulations, similar amplitudes, and no frequency going out of range. In the most coherent of subjects, the averages also demonstrated 50% of the highest amplitude at any given time.

Those subjects who were adequately hydrated, had been eating quality nutrition, and who also practiced meditation, showed significant differences in the BioCoherence readings.

## Test Results

***Average readings of amplitudes carried the significance in the data, and in every test case an increase in overall average amplitude range and/or a normalizing in frequency bandwidths were detected. These effects exemplified an overwhelming success in increasing the overall BioCoherence in the ranges from between 11-30% in over 94% of all test subjects.*** The re-distribution of bandwidths with abnormally high amplitudes or out of normal range were seen as positive change or if

they were reduced in range or became more normalized after the introduction of the LifeWave Energy Enhancer patches and were increased from abnormally low readings. From a biophysics standpoint, saving energy can be accomplished by normalizing out of bound frequency ranges, as well as increasing lowered amplitudes which are significantly below the normal range. In some case no changes were seen but it was less than 6% of the testing population, and was subsequently determined to be due to dehydration of the subject's tissues.

## **Testing Method**

Subjects were tested sitting down. The subject's name, age and sex were recorded. A baseline test was taken and 7 frequency bandwidths were measured. These bandwidths were termed "biozones" one through seven. The bandwidths and specific frequencies chosen were selected due to the overall stability of the 0-10 Hz bandwidth in the body, and its overall stabilizing effect makes these waves very difficult to change or modify. The specific frequencies had known Bionetic relationships and were chosen based on known frequencies to support specific glands, or neural plexii in the body. After the base reading was taken, (a minimum of 2.5 minutes) the readings were noted. The subject was then asked to hold the LifeWave Energy Enhancer patches, a white one in the right hand and a brown one in the left. The subject was instructed to sit and relax for 2.5 more minutes, and the test was repeated. The before and after tests were compared to one another, and in all cases other than dehydration, a positive change between 18% and 30% were measured across the board. All test subjects showed either expansion (increase in specific frequencies) or a re-normalization by the reduction of a single amplitude that was out initially out of range. This testing method proved unequivocally that the LifeWave Energy Enhancement patches do in fact make positive changes in the BioField of the body.

## **Elimination of Artifact**

If a subject's data showed a specific type of response, the testers were required to re-take the test. This response was known as movement artifact. Although it was unique to the testing data, and could change the overall readings, such tests were eliminated from the test sampling and the test was re-taken. The artifact data was less than 1% of all testing subjects and that data was not included in the results.

## **Energy as a Type of Body Currency**

It has been noted that the exchange and flow of energy within the body is vital to health. Energy as a commodity is actually a type of currency that the body uses in its day to day activities. Biophysics and Chinese Medicine agree that the equal distribution of energy is vital to the overall organism's success. The LifeWave Energy Enhancement patches increase the overall distribution of energy within the body and in many cases re-direct it for positive change. This testing method did not ascertain any base energy levels and compare them but compared the overall energy exchange as either a renormalization or increase in BioCoherence. There is significant opportunity to conduct further research regarding the use of BCA and biophysics data in future research. The Chinese Model of Medicine and Einstein Physics both agree that energy cannot be created or destroyed. In BCA it has been verified that this is true. Continued research may also play out the fact that energy as a commodity is more valuable than food, or water. Energy may in fact be the most vital factor relating to life itself.

## **Future Applications**

BioCoherence easily could be termed *BioSpectral Scanning Electromyography and Analysis*. Spectral information from the ground state has several applications to this

point: 1) before and after frequency shifting to show effectiveness of therapy. 2) Demonstrate the benefits of meditation and relaxation. 3) Demonstrate the benefits of adequate nutrition and hydration. 4) Energy demands to various organs, glands, or nerves, and changes to what is now referred to as the BioField (Rubik 2001), the electromagnetic waves emanating from the body.

Are included as both contributors to the character of the standing waves as well as being influenced by them.

Nutritional conditioning of the biomatrix.

Water types into the ground state.

Holistic therapies such as cold laser, sound induction, light therapy.

Eastern practices – meditation, relaxation, martial arts practice, chi gung

Nano Technology assessment

### **As A Biometrics Tool:**

Significant research has historically shown that it is difficult to make changes to the standing waves, until the advent of the LifeWave Energy Enhancer Patches. Initially hundreds of scans were done analyzing the long waves or 0-10 Hz range. These waves are extremely difficult to change, yet, it can be done. Long-term studies have yet to be initiated, but comparative tests of readings taken prior to an intervention such as sound, light, or frequencies, compared to readings taken subsequently after such an intervention have shown significant changes to the standing waves. Long waves show a particular affinity to BioField therapies which are electromagnetic in nature, and now

there is solid data signifying a significant impact on the BioField with the use of the LifeWave Energy Enhancement Patches.

## **Conclusions**

Although the research is in early stages, and must expand significantly to verify the actual application of current knowledge regarding these standing waves and their effect if any on the human body, currently these standing waves can be logged and recorded. The correlations to overall health, stress levels, and quality of connective tissues, hydration and mineralization of the cells all seem to have pronounced correlations with the readings of the wave harmonics and coherence and must be isolated in future assessments. Based on preliminary findings measurement of these various standing waves not only demonstrates a quality of coherence that can be recognized in each patient, but also due to the repeatability of the signatures of these waves within the individual, these waves can be analyzed over long-term. Inherently there is an effectively demonstrated value of information and the unique nature of the wave signatures of each patient may prove valuable from future studies. Initially the greatest value arises through the verification and wave analysis that these standing waves can be affected by various exogenous interventions, such as sound, laser light, colors, vibration, electrical impulses on the skin and ear, or via micro voltage stimulation to acupuncture points, etc.

In addition, through complex assessment, endogenous characterization of these interventions and changes to the standing waves in before and after characterization has now become possible and opens the door to the use of BCA as a “subtle energy” diagnostic methodology.

## **Nanotechnology Assessment Findings**

LifeWave LLC, developers of the LifeWave Energy Patch (LEP)

And NuVisions for Wellness, developers of the SpectraVision BCA Technology collaborated on measuring the effects of the LEP in the biomatrix. After analyzing over 1000 testing subjects in establishing BioCoherence baselines and then applying the LEP to the subject's body, demons-ratable shifts in standing wave characteristics have been noted. Changes in modulation, amplitudes, energy distribution, and absorption were all noted and initial findings showed significant changes in the standing wave characteristics of one or more aspects of BioCoherence. ***Overall these changes demonstrated shifts as increases in available energy potentials of ranges between 18 to 33% over baseline data for ALL TEST SUBJECTS! Energy distribution did support that the transfer of energy had both an accumulative effect and that some frequencies demonstrated a type of down regulation as other frequencies had simultaneous up regulation.***

Further testing is recommended and official studies should be undertaken to fully assess the true nature of the wave characterization when Nanotechnology or other BioField therapies are applied or influence the biomatrix.

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## Definitions

**BioCoherence** Analysis (BCA) is a new complex science based on the joining of aspects of Scanning EMG data collection and the application of bioenergetic principles and concepts of harmonic wave assessments as it applies to the endogenous frequencies of the body. BCA is the actual characterization of these frequencies. Aspects of the wave characterization include but are not limited to: amplitude such as high, average and low, signal strength demonstrated as modulation activity and comparative values of particular data set relationships as it pertains to harmonics, spectral analysis principles in frequencies within particular bandwidths, and assessment of the overall nature of the waves in concert. Although aspects of the harmonic wave assessment has no known direct relationship to particular organs or glands, at this time, due to the science of complexity, aspects of bioharmonics from other sciences effectively demonstrate bandwidth correlates. BCA is an emerging science developed by Lee G. Woolley.

Interference signals are usually generated by the AC power line, appliances such as radios, electrical outlets, and overhead lighting, but can be biologic in origin.

**BioCoherence** is the amplitude and wave modulation characteristics of the standing wave patterns and their relationship to one another. The more regulated the amplitudes of the waves are and the higher number of modulations per minute the more biocoherent the waves are.

**Bioenergetics** is the relationship of energy flow of the body as it correlates with the principles of Chinese Medicine or Eastern Esoteric Practices. It contains aspects of biophysics, mathematics, harmonics, and bioresonance.

**BioField** The *BioField* refers to the complex, dynamic, extremely weak EM field within and around the human body that has been proposed as a super-regulator of health and healing (Rubik, 2002). Besides the EM components of the *BioField* emitted by the brain

(EEG) and heart (ECG) that are well known in conventional medicine, the human *BioField* may also consist of more subtle energy fields as elaborated in Oriental Medicine, Ayurvedic Medicine, and other indigenous systems of medicine.

This subtle energy, vital force, or cosmic life energy is a key concept in many CAM modalities, and it is referred to by the many terms listed above from various medical systems (Rubik et al., 1994a). Such vitalistic principles underlie many CAM modalities besides energy medicine, but have been banished from conventional medicine. This fundamental philosophical difference is at the root of medicine's divided legacy (Coulter, 1994). The **BioField** contains information about the contents of and the intelligence that governs the organism. The sources of the energy and frequencies of that field include electromagnetic, cosmic induction fields, and electrogravitational fields.

**Bionetics** – A term used to refer to all aspects of the growing science that combines modern biofeedback technology with principles of Traditional Chinese Medicine, biophysics, and harmonic resonance as it relates to the body/mind influence on the energy pathways of the body.

**Biofeedback** – a non-invasive modality that takes direct, real-time measurements of the body's biodynamic responses regarding the various states or conditions of stress and is now commonly referred to as **Psychophysiology**. There are two types of biofeedback: 1) traditional in which the patient becomes aware of their physiological function and tries to modify that physiology through behavioral changes such as relaxation, breathing, etc. 2) Bionetic Feedback in which the patient becomes aware of their physiology via feedback technology, and bases on *principles of energy, changes can be made that are harmonious. This may include relaxation, but the practitioner aids in the interpretation of the results of the testing responses. Bionetics is a virtual testing process.*

**Bionetics (Bionetic Feedback)** – A non-invasive modality that takes direct, real-time measurements of the body's biodynamic responses regarding the various states or

conditions of stress. This information is then used to take steps to influence, change or attempt to modify the stress condition in a favorable way for optimal stress adaptation and wellness within the organism. These attempts can be **Inside-Out** (awareness and behavior modification-learning) or **Outside-In** (controlling the environment, biochemically and forcing changes or influencing the organism in a collaborative way, such as good nutrition, supplementation, vibration, and electromagnetic). Bionetic feedback is a multi-dimensional tool that brings the multi-dimensional insights required for true healing to take place. Using **Bionetic Feedback** responses, the practitioner can determine if there are herbs, vitamins, lifestyle changes, awareness's, etc., which will help people adapt to their individual circumstances.

**Bionetics** (S. Woolley, L. Woolley 1999) is a complex science founded on the premise that the body is intelligent (Innate) and that all processes within it are "Mindful" (F. Kapra), which further demonstrates that the body cannot be separated from the mind and neither can the mind be separated from the body, otherwise known as the **body/mind medicine**. Both mind and body function in a uniquely ordered manner which is highly organized in a Higherarchical substrate (Matrix) based on principles of Correspondence, Regulation, Inner harmony, Biophysics, and is based on the overall process of the Receiving, Processing and Distribution of Information/Energy within and throughout the organism in order to meet its purposes and objectives. Bionetics is founded within the science of psychophysiology, (behavioral medicine and biophysics).

**BioCoherence** (L. Woolley 2002) is the term that directly pertains to the quality, quantity, intensity, and modulation of the standing waves and their relationship within each subject as compared to the normative values. BioCoherence is greatest in subjects that practice Eastern modalities of wellness. While thought has been proven to negatively affect BioCoherence, it cannot positively create BioCoherence.

**Ground State** is defined as vast arenas of frequency potentials that are generated from within the connective tissues and/or cytoskeleton and fluid activities deep within the

body when the body is not in motion. It is the source of the data collected through BCA rather than being considered junk noise in traditional EMG applications. The ground state is the conducting medium which is rich with standing waves historically known as noise, and is now believed to carry biosignaling information via cellular transduction activity.

**Noise** inhibits the fidelity of the bioelectrical signals, which appear to be random fluctuations off of the baseline data and which can obscure the bioelectric signal collection. Noise can be background or generalized based on the ambient frequencies generated from the environment or adjacent power sources due to motors or microwaves, etc., or localized interference which is caused by movement of the electrodes, or internally generated by the recording equipment electronics or the amplifier itself. In some cases they can be biologic in origin which includes ground state activity in traditional EMG applications which have historically been filtered out as well.

**Standing Waves** are endogenous frequency potentials generated within the ground substance of the body. Standing waves are not to be confused with static waves. Standing waves are inherently and constantly available within the biomatrix or ground substance of the body. Standing waves flow within the Ground State and these waves are the focus of study in BCA and the standing waves it is deduced include imbedded biosignals and bioinformation for aspects of bioregulation.

**Tensegrity Matrix** as defined in Ingber's view of the cell as a tensegrity structure may help explain why cells in tissue culture spread out and flatten when grown on rigid glass or plastic petri dishes, but when on a flexible surface the cells contract and become spherical. Ingber modeled a cell as a tensegrity structure made of six wood dowels and elastic string. The wooden dowels occurred in three pairs, each perpendicular to the other two and bore the compressive stress. Tension bearing elastic string connected to the ends of the dowels, pulling them into a stable, 3-D form. A smaller, spherical tensegrity model, inside the larger one, represented the cell's nucleus. Stretched elastic strings between the nucleus and dowels mimicked cytoskeletal connections. Applying

downward force on the tensegrity cell model shapes it into a flattened pile of sticks and string. When the force is removed, the energy stored in the tensed filaments causes the cell model to spring back to its original, roughly spherical shape. The pictures above from Ingber's articles suggest how cells may behave when placed on a rigid or flexible surface. When attached to a taut, stretched piece of cloth the model flattens and spread out. The model's attachment to the flat cloth is analogous to the adhesion receptors (integrins) which physically connect a cell to an anchoring basement membrane substratum.

## **Bibliography:**

### **A Physical Theory of the Living State; *The Association-Induction Hypothesis*;**

G.N. Ling, Blaisdell, New York 1962.

### **Clinical Applications in Surface Electromyography: Chronic Musculoskeletal Pain.** Kasman, Cram, Wolf. Aspen Publications, Gaithersburg, MD, 1998.

**“Coherent Excitations and the Physical Foundations of Life”;** M. W. Ho; **Theoretical Biology; Epigenetic and Evolutionary Order from Complex Systems;** B. Goodwin and P. Saunders Eds., Edinburgh University Press, Edinburgh, 1989.

**Domains in Biological Membranes;** Jacobson K, and Vaz W.L.C.. *Comm. Mol. Cell Biophysics*.8 (1992)

**The Biofield Hypothesis: Its biophysical basis and role in medicine;** B. Rubik, *Journal of Complimentary Medicine* 2002, Dec 8; (6): 703-17.

**The Emerging Complex Science of Bionetics;** L. G. Woolley, Bionetic Research Foundation, Torchlight Publishing, Colorado Springs, CO, 1999.

**The Rainbow and the Worm;** *The Physics of Organisms.* Mae-Wan Ho, World Scientific Publishing Co. Pte. Ltd., River Edge NJ, USA, 1998.

**Thermodynamic Theory of Structure, Stability and Fluctuations;** P. Glansdorff, and I. Prigogine, Wiley, London, 1967.

**Synergetics;** R.B. Fuller, MacMillian Publishing Co, NY, NY, 1975

**Tensegrity; *The Architecture of Life*,** Donald E. Ingber, *Scientific American*, January 1998

**Cellular Tensegrity and Mechanochemical Transduction**, Annual Reviews of Physiology, Donald E. Ingber et al -1997, 19:329-339

**Tensegrity: The Architectural Basis of Cellular Mechanotransduction**, Donald E. Ingber, Annual Review of Physiology, Vol. 59, pages 575--599; 1997.