

EDS: AUTO-REGULATION & CELL SIGNAL ENHANCEMENT

by Barbara Brewitt, Ph.D.

Electrical activity is present in all living organisms, and electromagnetic fields underlie all levels of our physical health, from the molecular to organismic levels.¹ The electromagnetic forces both inside and outside of us play key regulatory roles in maintaining a healthy resonance in our lives. Outside the body, the geomagnetic field created by the earth's poles affects organ physiology, and the planetary rotation around the sun causes seasonal changes and shifts in light/dark cycles that dramatically affect our immunoneuroendocrine system with consequences for our emotions and sense of well-being. Inside the body, aberrations in the electrical potential of the cell membrane induce major changes in chemical reactions and DNA expression affecting protein synthesis, the organization of new biological forms, and even patterns in our behavior. For

The advantage that electrodermal screening (EDS) devices have over blood tests is their ability to measure changes over time with very little intrusion into the body. Used properly, EDS devices are capable of obtaining information that reflects these dynamic and subtle processes within us. EDS is conducive to repeated measurements and immediate feedback to the dynamic flow of our physiology. By contrast, the small volume of blood in the body makes repeated blood testing over a short period of time impractical or impossible. Electrical conductance measurements, taken frequently over a short period of time, can point to early distortions in physiological parameters that are susceptible to more natural forms of treatment. As a result of this dynamic perception of the body made possible by EDS, clinicians and patients are more likely to appreciate how frequent small dosing with more subtle, non-toxic medicinal approaches can steadily, though perhaps more slowly, rebalance the physiology of the body.

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these reasons, it is important that we recognize our bioelectric nature and how the electrical waves generated by our physical, emotional, psychic and spiritual being become attuned to and resonate with the outside world. The more ways that we can feed back to ourselves information about our electrical waveform activities, the more effectively we can adjust our attunement to the external world to maintain health.

Nature, as Irving Dardik says, is characterized by "waves that wave."² There are seasonal, monthly, daily, hourly and smaller rhythms within the world and within our bodies that help us to maintain and achieve preselected energy levels. Oscillating energy fields are tightly regulated through the use of both positive and negative feedback mechanisms. Our current diagnostic tools in medicine typically measure only a brief time frame, creating the appearance of a static state. Blood test results, for example, create a snapshot of physiological parameters at one instant of time, only revealing abnormal values long after considerable pathology has already developed. Clinicians then treat this "static" state with drugs targeted to make immediate changes which all too often lead to adverse "side" effects caused in part by these radical instantaneous shifts in our physiology.

Physiological health is characterized, first, by homeostasis, i.e. the body's ability to maintain internal equilibrium through dynamic processes of feedback and regulation; and second, by cell signalling, i.e. dynamic processes of communication between cells, organs and systems in the body. Homeostasis is achieved through positive and negative feedback loops which amplify a specific signal in order to achieve a goal. For example, as an unborn baby

travels down the birth canal, it amplifies and feeds back hormonal signals to the mother until the birth process is complete, at which point the hormonal signal stops. Positive feedback signals, however, can also be used by viruses as a way to manipulate specific host cell receptor signals at the cell membrane, resulting in greater viral replication.

Negative feedback involves a set point which, once reached, down-regulates signals that reset a system to its starting point. It is this subtle interplay of positive and negative feedback signals that results in well-regulated homeostasis. Disease processes disrupt these normally balanced mechanisms. As physiology becomes more pathogenic, one or more feedback loops within the body malfunction, resulting in too much or too little expression, distorting the body's electrical profiles. By measuring electrical resistances in the body over time, EDS devices provide clinicians with a dynamic profile of these normal or distorted oscillatory patterns.

Appropriate cell signalling is a second characteristic of vibrant health. Cell signalling occurs via messenger molecules or specific electromagnetic waveforms that carry information from the extra-cellular environment into the intra-cellular environment through cell membrane receptors and channels. Cell signalling involves distinct and unique electrical alterations at the cellular membrane. Messengers that act as cell signal

enhancers vary in form and structure, including small polypeptide proteins, (growth factors, hormones, and neurotransmitters), chemicals, and electrolytes (minerals). Electromagnetic fields can also function as cell signal enhancers. None of these polypeptide molecules, electrolytes, or electromagnetic forces need enter the target cell in order to induce the desired communication to the DNA. Once the cell surface receptor or cell membrane channel is triggered to change its

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three-dimensional conformation, a process called signal transduction begins which involves a cascading activation of intermediate or "secondary" messengers that carry the information from the cell membrane to the nucleus of the cell where DNA gene expression responds appropriately to the extra-cellular change.

Electromagnetic fields induce selective electrical changes in the micro-environment around and within cells. At the cellular level, a direct relationship exists between changes in the electrical potential of the cell membrane and signal transduction processes that lead to changes in gene expression.

Experiments *in vitro* quantitatively demonstrate that electromagnetic devices have therapeutic effects on immune and nervous system cells, including lymphocytes, natural killer cells, leukocytes, and neurons.^{3,4} For example, exposure of thymocytes to magnetic fields can enhance signal transduction processes via calcium second messengers.^{5,6} Minute exposures of cultured neuronal cells to direct current evoked protein synthesis, resulting in neuronal cell regeneration nearly equivalent to that of nerve growth factor.⁷

Disease states can be recognized by electrical conductances significantly different from those seen in the healthy state. EDS devices, when reliable, provide multi-organ screening and significant biosensing of human physiology, making it possible for EDS to serve as a valuable tool both for early diagnosis of pathophysiologies and for treatment. Given reliable EDS instruments to accurately measure changes in electrical conductances, this evolving field of "bioelectric medicine" holds great promise for the early diagnosis of significant disease states and for earlier and more effective natural treatments.

Early diagnosis of pathological conditions was demonstrated in Dr. Harold S. Burr's research on electrical potentials.^{8,9} Burr compared normal mice to the same strain of mice made to produce tumors after their forearms were exposed to a carcinogen. Normal "healthy" mice retained auto-regulation of oscillating waveforms of electrical potentials with frequencies that occurred at least every two weeks and at most every ten weeks. In contrast, mice with tumor forma-

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tion showed the ten week cycle, plus a long slow sinusoidal oscillating cycle of 32 weeks of electrical potential that was not present in the healthy state. Furthermore, the tumor-producing mice did not show the short two week cycle. Thus tumor formation in the mice may have correlated with shifts in electrical potential readings from a low amplitude, frequent (two week) oscillatory cycle to a high amplitude, infrequent (32 week) oscillatory cycle around the baseline value. Cancer-susceptible mice appeared to take longer to return to baseline values once electrical potential shifted away from normal ranges. The rate of return to normal electrical profiles may be a useful EDS parameter to evaluate in the clinical setting to assess shifts from normal to pathological states and back.

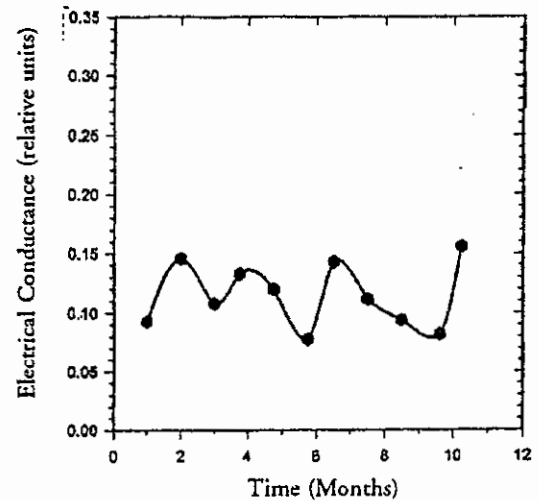
Let us consider the example of human immunodeficiency virus (HIV) which remains a pandemic infection around the world. HIV is characterized by rapid lymphocyte turnover and high rates of viral replication. Furthermore, HIV infection requires recently identified co-factors from the G-protein family located in the cell membrane to successfully infect human lymphocytes or monocytes.^{10,11} These G-proteins induce signal transduction processes that initiate ion transport mechanisms which are electrical in nature and act as positive/negative feedback switches to determine when and how long signalling pathways will be opened and what signals will be amplified. G-

proteins are standard mechanisms for growth factor cell signalling and are often used to amplify signals.¹² It is not surprising that viruses and bacteria "capture" the cell signalling powers of G-proteins to aberrantly manipulate cell signalling for their own purposes of replication. These aberrant signalling mechanisms can be identified through EDS devices.

The sharp contrast between EDS measurement values in the healthy state compared to that present in HIV infection is shown in the following examples. A pattern of healthy resonance is illustrated by the oscillatory waveform of electrical conductances measured at skin conductance points associated with the immune system on a relatively healthy woman (Figure 1). She maintained an oscillatory waveform pattern that was well regulated with small amplitudes ranging from 0.08 to 0.16 relative units.¹³ Note from the graph that the woman's waveform pattern also contained regular oscillating frequencies of approximately two month cycles. In contrast, a man beginning to develop symptoms from his HIV infection displayed a distorted oscillatory waveform pattern in electrical conductance that later came into balance when specific electrical treatment signals were given to him (Figure 2). Without treatment, this HIV seropositive patient had amplitudes in electrical conductances that widely ranged from 0.06 to 0.27 relative units (nearly twice that of the normal situation), and uneven frequencies with no distinct oscillatory cycle.

One interpretation of these findings is that the man with the HIV infection lacked auto-regulatory control, which could be due to HIV disrupting the positive and negative feedback mechanisms of the immune system. Thus it is possible that treatment with electromagnetic fields could entrain lymphocytes to produce more regulated rhythms. A deeper analysis of HIV behavior points to the necessary involvement of the G-proteins, fusin in the case of

EDS Oscillations in a "Healthy" Person



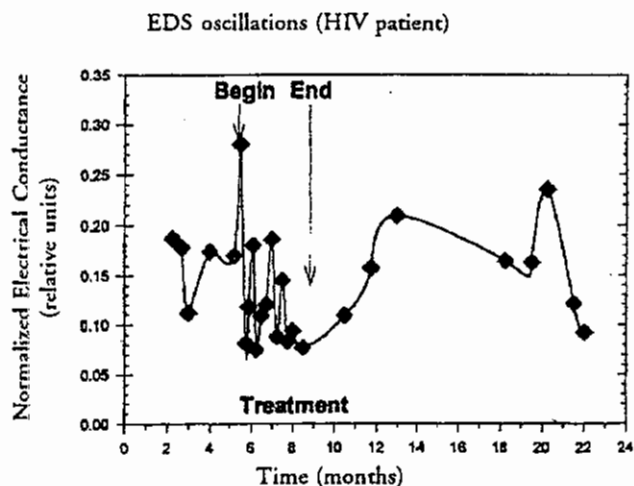
lymphocyte infection¹¹ and CC-CKR5 in the case of monocyte infection.¹² Since G-proteins are critical for signal transduction processes and HIV infection, it appeared that specific electrical frequencies corresponding to growth factors that normally activate the G-proteins in the body might inhibit the HIV virus from further replication.

Based on this interpretation, a treatment protocol was implemented to correct electrical conductance by using electrical signals nearly every day over a three month period (noted in

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graph). This patient was exposed to electrical signals at various skin conductance points. The frequency of these signals was correlated with that of specific human growth factors. His electrical waveform pattern changed



dramatically during this time of treatment and fell into the range of the 'healthy woman' with small amplitudes of 0.07 to 0.18 relative units and regular oscillating cycles. Corresponding to these normal electrical conductance patterns, this HIV+ patient's blood test measurements of peripheral blood CD8+, CD2+, CD3+ lymphocyte counts all rose by 38% and CD4+ lymphocyte counts rose by 76%.

These data suggest that frequent correction of these skin conductance values entrained the body's electrical patterns into the optimal range, resulting in a stronger immune system. An HIV viral load analysis for this patient was not available at the time of these studies, thus the obvious research question remains: Will frequent delivery of specific electrical signals corresponding to specific human

growth factors reduce the HIV viral load?

The hypothesis supported by these two case examples is that 'health' correlates with a frequent oscillatory period with a low amplitude around a baseline value. When the body's electrical waveforms are resonating rhythmically, it auto-regulates back to an optimal range of vibrant health. Chronic viral

illness and other disease states change the electro-magnetic control systems of the body with consequential loss of coherence. A healthy state responds to disruptions of electrical conductance by more

rapidly returning to normal compared to a person with abnormal physiology and disrupted homeostasis. Through the use of EDS devices, clinicians can determine a person's oscillating changes in electrical signals over time to determine their rhythms. Also, clinicians can use EDS devices to quantitatively determine the potential effects of the medicines they prescribe for patients, and later use these same devices to send electrical signals to patients to balance their electrical profiles, bringing them back into optimal range.

Bioelectric medicine using EDS devices offers clinicians new quantitative methods for evaluating subtle electromagnetic changes in their patients. Early detection of subtle changes in physiology can

guide more effective and gentle treatments, facilitating a gradual transition to health. And since we are all comprised of electromagnetic waves rhythmically oscillating with nature, all the rhythms of our daily activities—the timing of meals or taking medication, our wake/sleep cycles, our patterns of exercise and relaxation—contribute to the balance of our health. As our consciousness awakens to our rhythmic nature, EDS devices may become even more widely useful, teaching the healthy as well as the sick to dance more in step with the universal energies around and within us.

One note of caution. Electrical and magnetic devices can be harmful as well as helpful.¹⁴ Further clinical evaluation is necessary to determine the benefits of and differences between various techniques and devices. Persons whose health is fragile are very sensitive to intervention of any type and intervention with electromagnetic forces can be highly specific. This can be as quickly dangerous to a fragile person as it is helpful, thus accurate monitoring of the consequences of these electromagnetic interventions is necessary.

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