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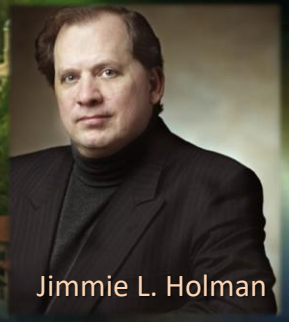
Bosnia 2017

PulsedTech's Bioenergetic & Bioelectric Technologies

Natural Frequency Concepts, the Energetic Rhythms of Life, & The Bosnian Pyramids



Jimmie L. Holman

Paul V. Dorneanu

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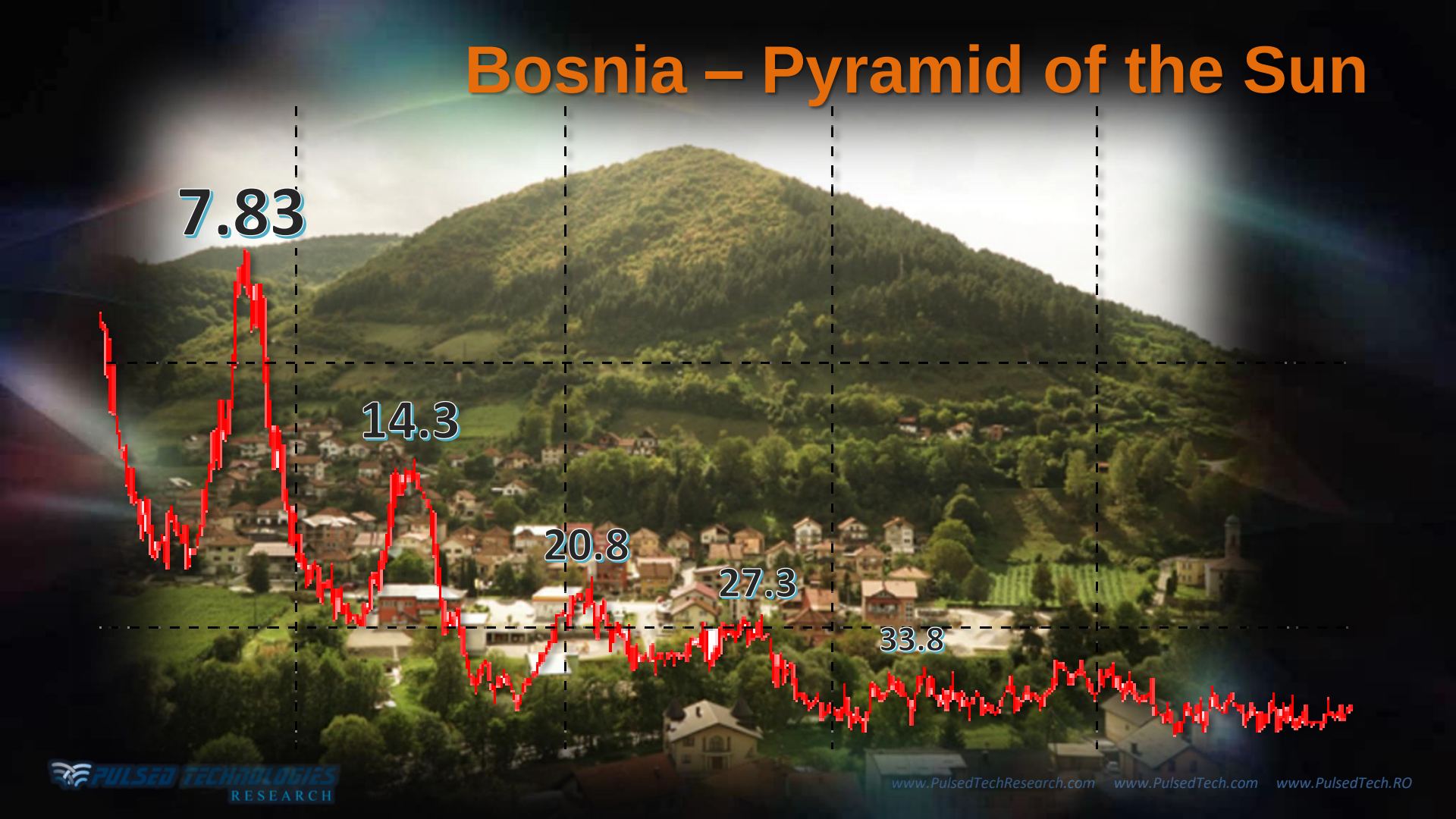
Bosnia – Pyramid of the Sun



Lightening

- **The Schumann Resonances are a phenomena resulting form the constant lightening discharges occurring all over the globe?**

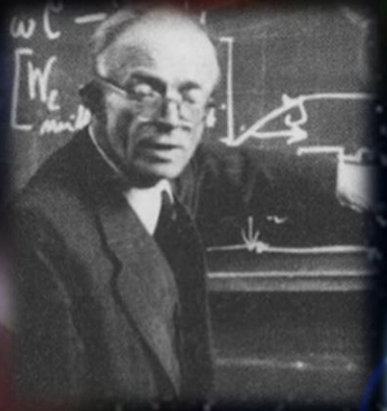
At any given time:

- There are about 2000 thunderstorms occurring around the globe
- There are about 50 lightening events per second

Schumann Resonance

Schumann Resonance: The Earth's Pulse

Dr. Winfried Otto Schumann



Schumann Resonance

7.83 14.3 20.8 27.3 33.8

7.8 14.1 20.3 26.4 32.5

Brainwave States

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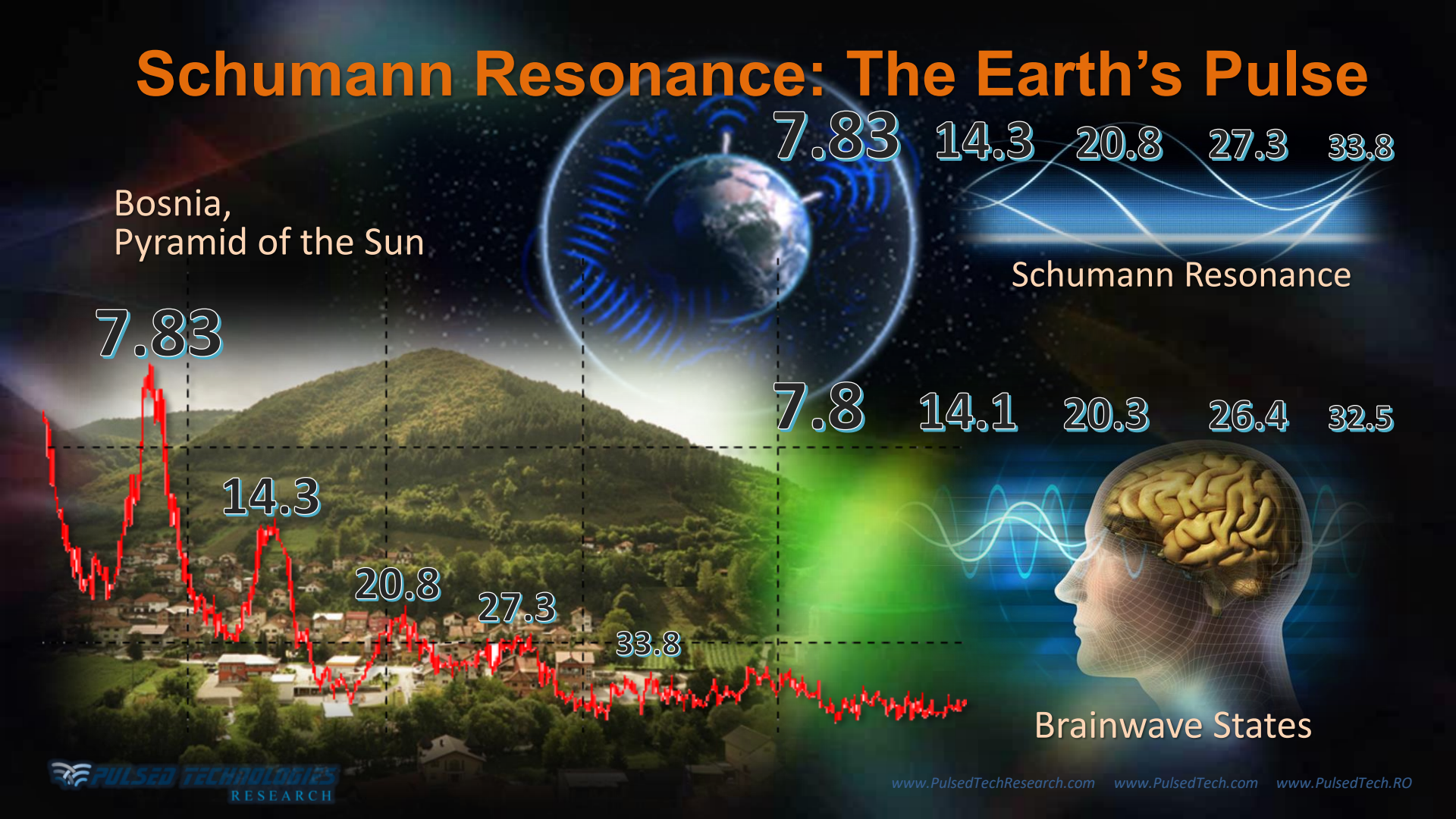
Schumann Resonance: The Earth's Pulse



Is there a CONNECTION ?

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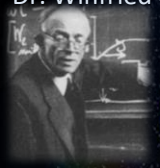
Relationships & Connections


Dr. Winfried Otto Schumann


Schumann Resonance


Electro-Pollution

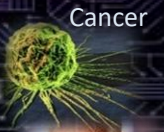
Wireless

Smart-Meters

Cell Phones

Wi-Fi


"Dirty" Power


Cancer


Lyme


Alzheimer

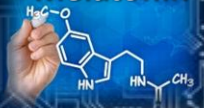

Autism

Anti-Oxidants


Astronauts/Cosmonauts

Spacecraft/Spacesuits

Brainwave States


Melatonin


Repair & Regeneration


Pineal Gland

VSG

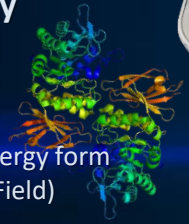

Sleep

Anesthesia (Induced)

Serotonin & Other MM


DMT

Cellular Energy


Enzymes

(Capture of Free Energy form Oscillating Electric Field)


Toxic Foods & Environment


Dr. Robert O. Becker

Dr. Ralph Gerard


Dr. Olena Bukalo

Dr. Albert Szent-Gyorgyi

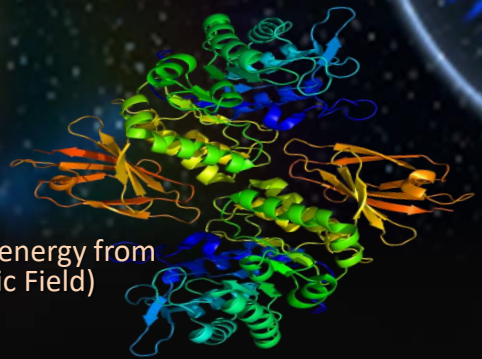
PULSED TECHNOLOGIES RESEARCH

Schumann as a Source of Power

Spacecraft/Spacesuits

Schumann Resonance

Cellular Energy



Enzymes

(Capture of Free energy from Oscillating Electric Field)

Yuri Gagarin - 1st Man in Space

Was Yuri Gagarin really First Man in Space ?

Months after Return

Major-General Vladimir Ilyushin

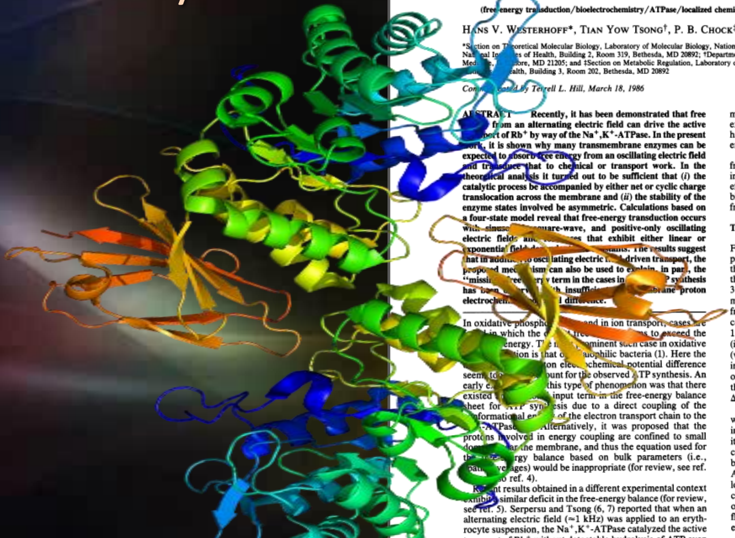
Many believe Ilyushin was actually the first man in space but returned in such bad condition he couldn't be shown to the public

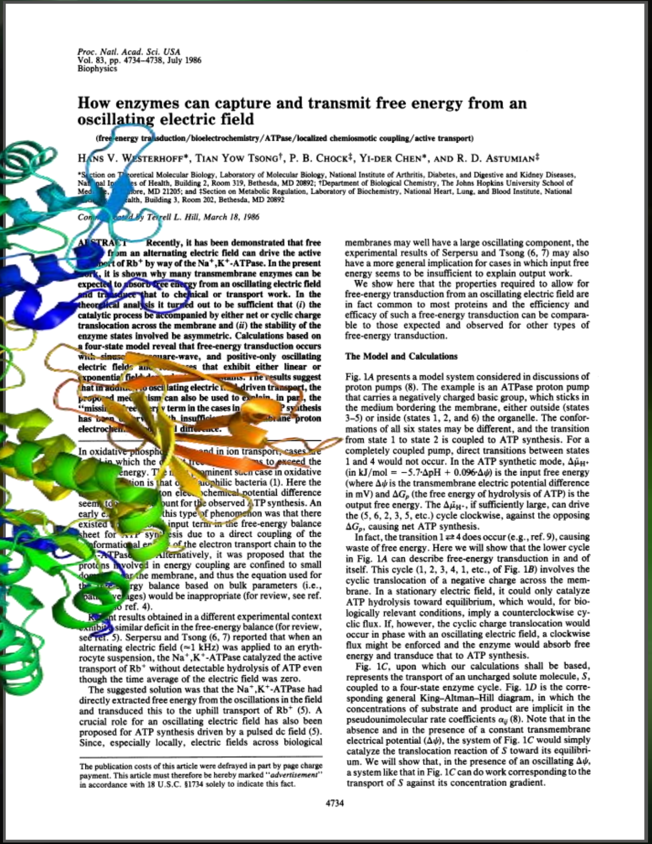
Diminished Capacity

Even today, astronauts and cosmonauts return weak after leaving the Schumann Cavity of Earth

Schumann as a Source of Power

Enzymes





Proc. Natl. Acad. Sci. USA
Vol. 83, pp. 4734–4738, July 1986
Biophysics

How enzymes can capture and transmit free energy from an oscillating electric field

(free-energy tra[illegible]sduction/bioelectrochemistry/ATPase/localized chemiosmotic coupling/active transport)

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Con[illegible] by Te[illegible]rell L. Hill, March 18, 1986

A[illegible]STRA[illegible]T Recently, it has been demonstrated that free [illegible] fr[illegible]om an alternating electric field can drive the active [illegible]ort of Rb^+ by way of the Na^+,K^+-ATPase. In the present [illegible], it is shown why many transmembrane enzymes can be expected to [illegible] free energy from an oscillating electric field and tra[illegible] that to che[illegible]ical or transport work. In the theor[illegible]ical analysis it tur[illegible]ed out to be sufficient that (*i*) the catalytic process be accompanied by either net or cyclic charge translocation across the membrane and (*ii*) the stability of the enzyme states involved be asymmetric. Calculations based on a four-state model reveal that free-energy transduction occurs with [illegible] square-wave, and positive-only oscillating electric field[illegible] that exhibit either linear or exponentia[illegible] [illegible] results suggest that in [illegible] osci[illegible]lating electric [illegible]-driven transport, the propo[illegible]d me[illegible]ism can also be used to [illegible], in par[illegible], the "missi[illegible] term in the cases in [illegible]P synthesis has [illegible] insuffici[illegible] [illegible]rane proton electroche[illegible] [illegible] difference.

In oxidative phosph[illegible] and in ion transport, cases [illegible] [illegible] in which the [illegible] [illegible]s to exceed the [illegible] energy. T[illegible] [illegible]minent such case in oxidative [illegible]tion is that o[illegible] [illegible]alophilic bacteria (1). Here the [illegible] [illegible]ton electrochemical potential difference seem[illegible] to [illegible] [illegible]unt for the observed ATP synthesis. An early e[illegible] this type of phenomenon was that there existed [illegible] input term in the free-energy balance sheet for ATP syn[illegible]esis due to a direct coupling of the [illegible]formational en[illegible] of the electron transport chain to the [illegible]-ATPase. Alternatively, it was proposed that the protons involved in energy coupling are confined to small do[illegible] [illegible]ar the membrane, and thus the equation used for th[illegible] [illegible]rgy balance based on bulk parameters (i.e., [illegible] [illegible]ges) would be inappropriate (for review, see ref. [illegible]o ref. 4).

R[illegible]nt results obtained in a different experimental context exhibit [illegible] similar deficit in the free-energy balance (for review, see ref. 5). Serpersu and Tsong (6, 7) reported that when an alternating electric field (≈1 kHz) was applied to an erythrocyte suspension, the Na^+,K^+-ATPase catalyzed the active transport of Rb^+ without detectable hydrolysis of ATP even though the time average of the electric field was zero.

The suggested solution was that the Na^+,K^+-ATPase had directly extracted free energy from the oscillations in the field and transduced this to the uphill transport of Rb^+ (5). A crucial role for an oscillating electric field has also been proposed for ATP synthesis driven by a pulsed dc field (5). Since, especially locally, electric fields across biological membranes may well have a large oscillating component, the experimental results of Serpersu and Tsong (6, 7) may also have a more general implication for cases in which input free energy seems to be insufficient to explain output work.

We show here that the properties required to allow for free-energy transduction from an oscillating electric field are in fact common to most proteins and the efficiency and efficacy of such a free-energy transduction can be comparable to those expected and observed for other types of free-energy transduction.

The Model and Calculations

Fig. 1*A* presents a model system considered in discussions of proton pumps (8). The example is an ATPase proton pump that carries a negatively charged basic group, which sticks in the medium bordering the membrane, either outside (states 3–5) or inside (states 1, 2, and 6) the organelle. The conformations of all six states may be different, and the transition from state 1 to state 2 is coupled to ATP synthesis. For a completely coupled pump, direct transitions between states 1 and 4 would not occur. In the ATP synthetic mode, $\Delta\tilde{\mu}_{H^+}$ (in kJ/mol $= -5.7\cdot\Delta pH + 0.096\cdot\Delta\psi$) is the input free energy (where $\Delta\psi$ is the transmembrane electric potential difference in mV) and ΔG_p (the free energy of hydrolysis of ATP) is the output free energy. The $\Delta\tilde{\mu}_{H^+}$, if sufficiently large, can drive the (5, 6, 2, 3, 5, etc.) cycle clockwise, against the opposing ΔG_p, causing net ATP synthesis.

In fact, the transition $1 \rightleftarrows 4$ does occur (e.g., ref. 9), causing waste of free energy. Here we will show that the lower cycle in Fig. 1*A* can describe free-energy transduction in and of itself. This cycle (1, 2, 3, 4, 1, etc., of Fig. 1*B*) involves the cyclic translocation of a negative charge across the membrane. In a stationary electric field, it could only catalyze ATP hydrolysis toward equilibrium, which would, for biologically relevant conditions, imply a counterclockwise cyclic flux. If, however, the cyclic charge translocation would occur in phase with an oscillating electric field, a clockwise flux might be enforced and the enzyme would absorb free energy and transduce that to ATP synthesis.

Fig. 1*C*, upon which our calculations shall be based, represents the transport of an uncharged solute molecule, *S*, coupled to a four-state enzyme cycle. Fig. 1*D* is the corresponding general King–Altman–Hill diagram, in which the concentrations of substrate and product are implicit in the pseudounimolecular rate coefficients α_{ij} (8). Note that in the absence and in the presence of a constant transmembrane electrical potential ($\Delta\psi$), the system of Fig. 1*C* would simply catalyze the translocation reaction of *S* toward its equilibrium. We will show that, in the presence of an oscillating $\Delta\psi$, a system like that in Fig. 1*C* can do work corresponding to the transport of *S* against its concentration gradient.

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Capture of Free Energy from the Oscillating Electric Field

Aka: Schumann Resonance

Enzymes

Capture of Free Energy from the Oscillating Electric Field

Aka: Schumann Resonance

Proc. Natl. Acad. Sci. USA
Vol. 93, pp. 4754–4758, July 1996
Biophysics

How enzymes can capture and transmit free energy from an oscillating electric field

(free-energy transduction/transferosomics/ATPase/localized chemiosmotic coupling/active transport)

HANS V. WESTERHOFF*, TIAN YOW TSONG†, P. B. CHOCK‡, YI-DER CHEN*, AND R. D. ASTUMIAN§

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Communicated by Terrell L. Hill, March 18, 1996

ABSTRACT Recently, it has been demonstrated that free energy from an alternating electric field can drive the active transport of Rb^+ by way of the Na^+,K^+-ATPase. In the present work, it is shown why many transmembrane enzymes can be expected to absorb free energy from an oscillating electric field and transduce that in chemical or transport work. In the theoretical analysis it turned out to be sufficient that (*i*) the catalytic process be accompanied by either net or cyclic charge translocation across the membrane and (*ii*) the stability of the enzyme states involved be asymmetric. Calculations based on a four-state model reveal that free-energy transduction occurs with sinusoidal-, square-wave, and positive-only oscillating electric fields and for cases that exhibit either linear or exponential field-dependent rate constants. The results suggest that in addition to oscillating electric field-driven transport, the proposed mechanism can also be used to explain, in part, the "missing" free-energy term in the cases in which ATP synthesis has been observed with insufficient transmembrane proton electrochemical potential difference.

In oxidative phosphorylation and in ion transport, cases are known in which the free energy available seems to exceed the input free energy. The most prominent such case in oxidative phosphorylation is that of alkalophilic bacteria (1). Here the transmembrane proton electrochemical potential difference seems too low to account for the observed ATP synthesis. An early explanation of this type of phenomenon was to postulate an additional input term in the free-energy balance sheet for ATP synthesis due to a direct coupling of the conformational energy of the electron transport chain to the T_2F_1-ATPase (2). Alternatively, it was proposed that the protons involved in energy coupling are confined to small domains near the membrane, and thus the equation used for the free-energy balance based on bulk parameters (i.e., spatial averages) would be inappropriate (for review see ref. 3; see also ref. 4).

Recent results obtained in a different experimental context exhibit a similar deficit in the free-energy balance (for review, see ref. 5). Serrano and Tsong (6) reported that an alternating electric field (ac) with a frequency in the range of the Na^+,K^+-ATPase catalyzed the active transport of Rb^+ without detectable hydrolysis of ATP even though the time average of the electric field was zero.

The suggested solution was that the Na^+,K^+-ATPase had directly extracted free energy from the oscillations in the field and transduced this to the uphill transport of Rb^+ (5). A crucial role for an oscillating electric field has also been proposed for ATP synthesis driven by a pulsed dc field (3). Since, especially locally, electric fields across biological membranes may well have a large oscillating component, the experimental results of Serrano and Tsong (6, 7) may also have a more general implication for cases in which input free energy seems to be insufficient to explain output work.

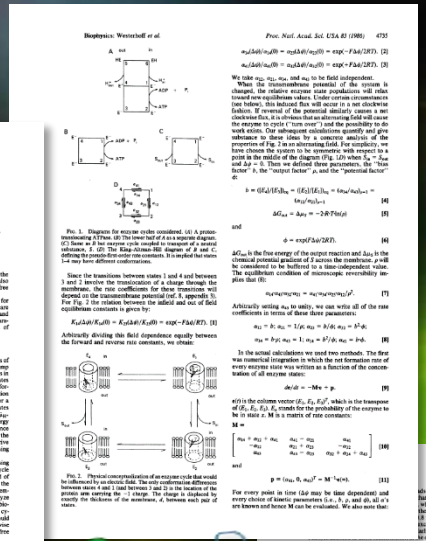
We show here that the properties required to allow for free-energy transduction from an oscillating electric field are in fact common to most proteins and the efficiency and efficacy of such a free-energy transducer is found to be comparable to those expected and observed for other types of free-energy transduction.

The Model and Calculations

Fig. 1A presents a model system considered in discussions of proton pumps (8). The example is an ATPase proton pump that carries a negatively charged titrating group, which shifts in the medium bordering the membrane, either outside (states 5–8) or inside (states 1, 2, and 3) the organelle. The combinations of all six states may be different, and the transition from state 1 to state 2 is coupled to the synthesis of one molecule of ATP, and, conversely, direct transition between states 4 and 5 is coupled to the hydrolysis of ATP by synthetic base. Also in (*A*) $\Delta\psi = -7.7\,\Delta pH + 0.06\,\Delta\Delta\psi$ is the input free-energy (where $\Delta\Delta\psi$ is the transmembrane electric potential difference in mV) and ΔG_{ATP} the free-energy delivery of ATP) is the output free energy. The $\Delta\psi_{in}$, if sufficiently large, can drive (5, 6, 7, 3, 5, etc.) cyclic clockwise, against the opposing ΔG_{ATP}, running net ATP synthesis.

In fact, the transition of a 4-state enzyme (e.g., ref. 9) is a waste of free energy. Here we will show that the lower cycle in Fig. 1*A* can describe free-energy transduction in and of itself. This cycle (1, 2, 3, 4, 1, etc., of Fig. 1*B*) involves the cyclic translocation of a negative charge across the membrane. In a stationary electric field, it could only catalyze ATP hydrolysis (or synthesis) in equilibrium, which would, for biologically relevant conditions, imply a counterclockwise cyclic flux. If, however, the cyclic charge translocation would occur in phase with an oscillating electric field, a clockwise flux might be enforced under the proper conditions and free energy could transduce that to ATP synthesis.

Fig. 1*C*, upon which our calculations shall be based, represents the transport of an uncharged solute molecule, *S*, coupled to a four-state enzyme cycle. Fig. 1*D* is the corresponding general King–Altman–Hill diagram, in which the concentrations of substrate and product species are implicit in the pseudounimolecular rate coefficients a_{ij} (8). Note that in the absence and in the presence of a transmembrane translocation electrical potential (Δψ), the system of Fig. 1*C* would simply catalyze the translocation reaction of *S* toward its equilibrium. We will show that, in the presence of an oscillating Δψ, a system like that in Fig. 1*C* can do work corresponding to the transport of *S* against its concentration gradient.



Biophysics: Westerhoff et al. Proc. Natl. Acad. Sci. USA 83 (1986) 4735

FIG. 1. Diagrams for enzyme cycles considered. (*A*) A proton-translocating ATPase. (*B*) The lower half of *A* as a separate diagram. (*C*) Same as *B* but enzyme cycle coupled to transport of a neutral substance, *S*. (*D*) The King–Altman–Hill diagram of *B* and *C*, defining the pseudo-first-order rate constants. It is implied that states 1–4 may have different conformations.

Since the transitions between states 1 and 4 and between 3 and 2 involve the translocation of a charge through the membrane, the rate coefficients for these transitions will depend on the transmembrane potential (ref. 8, appendix 5). For Fig. 2 the relation between the forward and reverse rate coefficients is given by

$$k_{12}(\Delta\psi)/k_{21}(0) = k_{12}(\Delta\psi)/k_{12}(0) = \exp(-F\Delta\psi/2RT). \quad [1]$$

Arbitrarily dividing this field dependence equally between the forward and reverse rate constants, we obtain:

FIG. 2. Physical conceptualization of an enzyme cycle that would be influenced by an electric field. The only conformation differences between states 1 and 1′ and between 2 and 2′ is the location of the protein arm carrying the −1 charge. The charge is displaced by exactly the thickness of the membrane, *d*, between each pair of states.

$$a_{12}(\Delta\psi)/a_{12}(0) = a_{12}(\Delta\psi)/a_{21}(0) = \exp(-F\Delta\psi/2RT). \quad [2]$$

$$a_{34}(\Delta\psi)/a_{34}(0) = a_{34}(\Delta\psi)/a_{43}(0) = \exp(+F\Delta\psi/2RT). \quad [3]$$

We take a_{32}, a_{21}, a_{34}, and a_{43} to be field independent.

When the transmembrane potential of the system is changed, the relative enzyme state populations will relax toward new equilibrium values. Under certain circumstances (see below), this induced flux will occur in a net clockwise fashion. If reversal of the potential similarly causes a net clockwise flux, it is obvious that an alternating field will cause the enzyme to cycle ("turn over") and the possibility to do work exists. Our subsequent calculations quantify and give substance to these ideas by a concrete analysis of the properties of Fig. 2 in an alternating field. For simplicity, we have chosen the system to be symmetric with respect to a point in the middle of the diagram (Fig. 1*D*) when $S_{in} = S_{out}$ and $\Delta\psi = 0$. Then we defined three parameters, the "bias factor" *b*, the "output factor" ρ, and the "potential factor" *n*:

$$b = (k_{34}'/k_{12}')/(k_{43}/k_{21}) = (a_{34}'/a_{12}')/(a_{43}/a_{21}) = (a_{34}'/a_{12}')/(a_{43}/a_{21}) = \ldots \quad [4]$$

$$\Delta G_{ATP} = \Delta\mu_S = -2.6F\Delta\psi \quad [5]$$

and

$$\rho = \exp(F\Delta\psi/2RT). \quad [6]$$

ΔG_{ATP} is the free energy of the output reaction and $\Delta\mu_S$ is the chemical potential gradient of *S* across the membrane. ρ will be considered to be buffered to a time-invariant value. The equilibrium condition of microscopic reversibility implies that (8):

$$a_{12}a_{23}a_{34}a_{41} = a_{21}a_{32}a_{43}a_{14}; \quad [7]$$

Arbitrarily setting a_{43} to unity, we can write all of the rate coefficients in terms of these three parameters:

$$a_{12} = b\cdot a_{43} = 1;\ a_{21} = a_{43} = b'/b;\ a_{23} = b'\cdot a_{43} = b'/b;$$
$$a_{34} = b\rho;\ a_{41} = 1;\ a_{14} = b'/b;\ a_{32} = b\cdot b. \quad [8]$$

In the actual calculations we used two methods. The first was numerical integration in which the net formation rate of every enzyme state was written as a function of the concentration of all enzyme states:

$$de/dt = -\mathbf{M}e + p. \quad [9]$$

$e(t)$ is the column vector $(E_1, E_2, E_3)^T$, which is the transpose of (E_1, E_2, E_3). E_4 stands for the probability of the enzyme to be in state 4. **M** is a matrix of rate constants:

$$\mathbf{M} = \begin{bmatrix} a_{41}+a_{21} & -a_{12} & -a_{14} \\ -a_{21} & a_{12}+a_{32} & -a_{23} \\ -a_{41} & -a_{32} & a_{14}+a_{23} \end{bmatrix} \quad [10]$$

and

$$p = (a_{41}, 0, a_{43})^T = M^{-1}e(\infty). \quad [11]$$

For every point in time ($\Delta\psi$ may be time dependent) and every choice of kinetic parameters (b, ρ, b', and $\Delta\psi$), we are known and hence **M** can be evaluated. We also note that:

$$de/dt = \mathbf{V}e + \mathbf{q}, \quad [12]$$

where **v** is the column vector $(v_{1in}, v_{2inner}, v_{3out}, v_{4ATP})^T$. Any **v** stands for the number of net transitions along a branch in the cycle of Fig. 1*D*. **V** is the 4×3 matrix:

$$\mathbf{V} = \begin{bmatrix} -a_{14} & a_{41} & -a_{41} & -a_{41} \\ 0 & -a_{21} & a_{21} & a_{21} \\ a_{14} & 0 & -a_{32} & -a_{32} \\ 0 & a_{12} & a_{32} & 0 \end{bmatrix} \quad [13]$$

and

$$\mathbf{q} = (a_{41}, 0, a_{43}, 0)^T. \quad [14]$$

The program MLAB (10), running on the National Institutes of Health DEC10 computer, was used to solve the above two differential equations numerically.

For cases in which the electric field was a square wave, we solved Eq. 9 analytically for each period of constant field:

$$e(t) = e(\infty) + Ae^{L(t)}e. \quad [15]$$

A is a 3×3 matrix, the columns of which correspond to the eigenvectors of matrix **M**, and $L(t)$ is the 3×3 matrix given by

$$L(t) = \begin{bmatrix} \exp(-\lambda_1 t) & 0 & 0 \\ 0 & \exp(-\lambda_2 t) & 0 \\ 0 & 0 & \exp(-\lambda_3 t) \end{bmatrix} \quad [16]$$

λ_1, λ_2, λ_3 are the eigenvalues of **M**, and **e** is obtained from the initial conditions.

$$e = A^{-1}[e(0) - e(\infty)]. \quad [17]$$

Integrating Eq. 12 from $t = 0$ to t using Eq. 7 and the fact that only $L(t)$ depends on time, we find:

$$e(t) = \mathbf{V}A\mathbf{K}(t)e + t\mathbf{V}\mathbf{M}^{-1}q + q \quad [18]$$

with

$$\mathbf{K}(t) = \begin{bmatrix} (1-e^{-\lambda_1 t})/\lambda_1 & 0 & 0 \\ 0 & (1-e^{-\lambda_2 t})/\lambda_2 & 0 \\ 0 & 0 & (1-e^{-\lambda_3 t})/\lambda_3 \end{bmatrix}. \quad [19]$$

Using Eq. 18 for consecutive time periods of different, but constant, potentials we could calculate the net number of transitions through any of the branches of the cycle of Fig. 1*D*. Yields and efficiencies reported are for the cycles after the oscillations in enzyme states had become periodic.

The calculations in this paper were performed around a temperature of 310 K (37°C), where $RT = 26.7$ mV, $F/2RT = 0.2$ (i.e., $\Delta G_{ATP} = 26$ mV), frequency $\nu = 2$ s^{-1}. These values were found to yield optimal efficiency for a square-wave field at a *b* value of 500.

Results

The application of an oscillating electric field to a system such as that shown in Fig. 1*C* will result in free-energy absorption if an oscillation of the phase between states on the left and right is induced. Part of this absorbed free energy can be transduced if the oscillations in state occupancy and flux in one of the transitions of the cycle is coupled to an endergonic chemical reaction, such as the synthesis of one molecule of ATP or outputs in Fig. 1*B*). A scenario is as follows. Suppose that in the absence of an electrical potential there is a bias in the equilibrium constants such that $[E_1]_{eq} > [E_3]_{eq}$ and $[E_4]_{eq} >> [E_2]_{eq}$. Since the transitions 4 ⇄ 3 and 1 ⇄ 2 are independent of the field, such a bias in concentrations would also be in effect after a long time in a constant electric field, say positive on the left. A sudden inversion of the electric field would have the reverse bias to the right. Since, however, less enzyme is in state 3 than there is in state 4, state 3 gets depleted more rapidly and more enzyme moves from 4 to 1 than from 3 to 2. If such a movement is followed by a resupply/distribution between the enzyme states 1 and 2, $[E_2]$ would again become higher than $[E_1]$ and sudden inversion of the field would cause more flux from 2 to 3 than from 1 to 4. The net consequence of one complete cycle of the oscillating field would be flow from 4 to 1 and flow from 2 to 3, with transduction of free energy from the field to, for example, a chemical or other work, a cyclic turnover of the enzymes.

Oscillating Electric Field Can Do Work. Fig. 3 gives a case in which it has been calculated that the system in Fig. 2 can do work in an oscillating electric field as anticipated above. At $\nu = 0$ the system starts in its zero field equilibrium, which, owing to the choice $b = 500$, implies that $[E_1]$ (the full line in Fig. 3*A*) and $[E_3]$ (the upper dashed line) are slightly less than 0.5, whereas $[E_2]$ (the dotted line) and $[E_4]$ (the lower dashed line) are approximately equal to 0.1% of total enzyme concentration. As the electric field begins to increase, $[E_4]$ and $[E_2]$ begin to decrease at the same rate. However, because $[E_4] >> [E_2]$ the flux from E_4 to E_1 is sustained longer. The flux from E_2 to E_3 gives rise to a transient increase in E_3, which leads to a flux to E_2. Indeed, E_3 is seen to increase and traverses a maximum at time 1 when the electric field is approximately maximal. Upon decrease and reversal

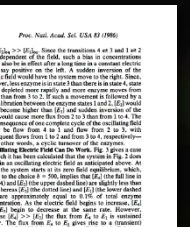


FIG. 3. How an oscillating electric field can cause an enzyme to cycle. Calculation for the model in Fig. 1*D* with parameter values $b = 500$, $\Delta\psi = \pm 42$ mV, $\rho = 0.5$, frequency $= 7.4$. (*A*) The normalized fractional concentrations of the enzyme states. (*B*) The electric field as a function of time. (*C*) The electric field, E_1, the number of transitions from E_1 to E_2 ($\longrightarrow$) as functions of time.

Tsong and Astumian (5), this provides a conformational and electrical energy. In such a system, the transduction efficiency of the equilibrium between enzyme states 4 and 1 and between 3 and 2). As a thermodynamic parameter may then only be 100%. Such a mechanism was proposed by Tsong and Astumian (5) for T_2F_1-ATP synthase. Yet, such a mechanism would not be necessary and one of the ramifications of the present work is that, theoretically, an (or chemical) work reported in this paper could cause an oscillating electric field and thus give rise to free-energy transduction without the same energy addition or "high-energy" intermediate. This possibility is of course contingent upon the not only one parameter (i.e., the electric field) but also from the outside. Only if it would have [Illegible] (11), and Slotte et al. (12).

We thank Mercy Peres for typing this manuscript. This work was supported, in part, by National Institutes of Health Grant GM28795 to T.Y.T.

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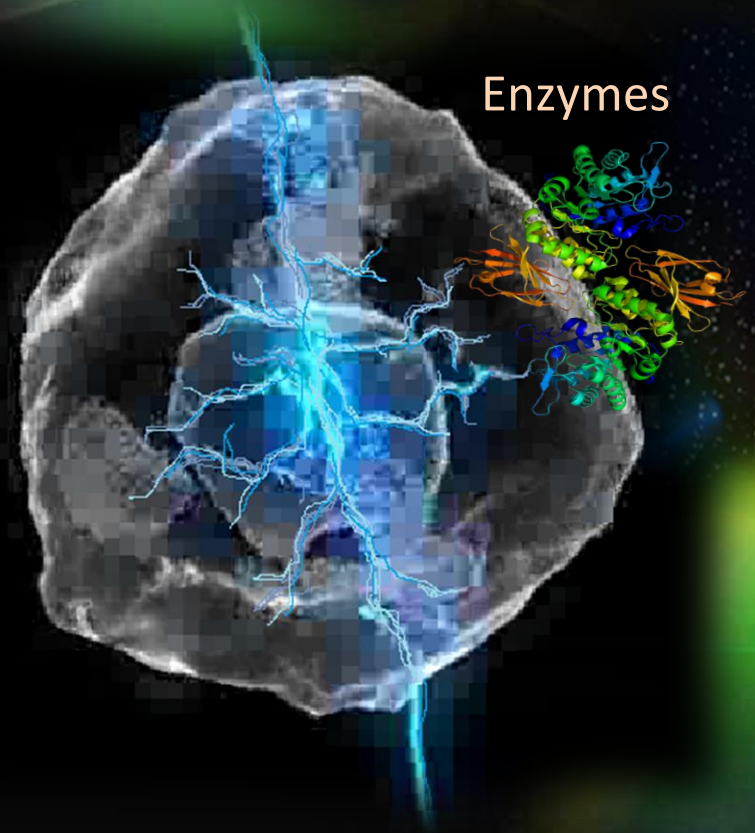
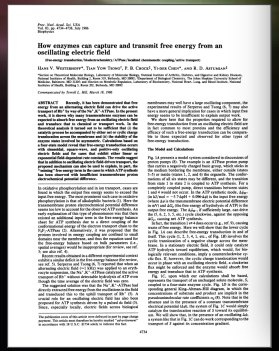
Enzymes





How enzymes can capture and transmit free energy from an oscillating electric field

Capture of Free Energy from the Oscillating Electric Field

Aka: Schumann Resonance

Is there a CONNECTION ?

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Bosnian Pyramids - Places for Healing

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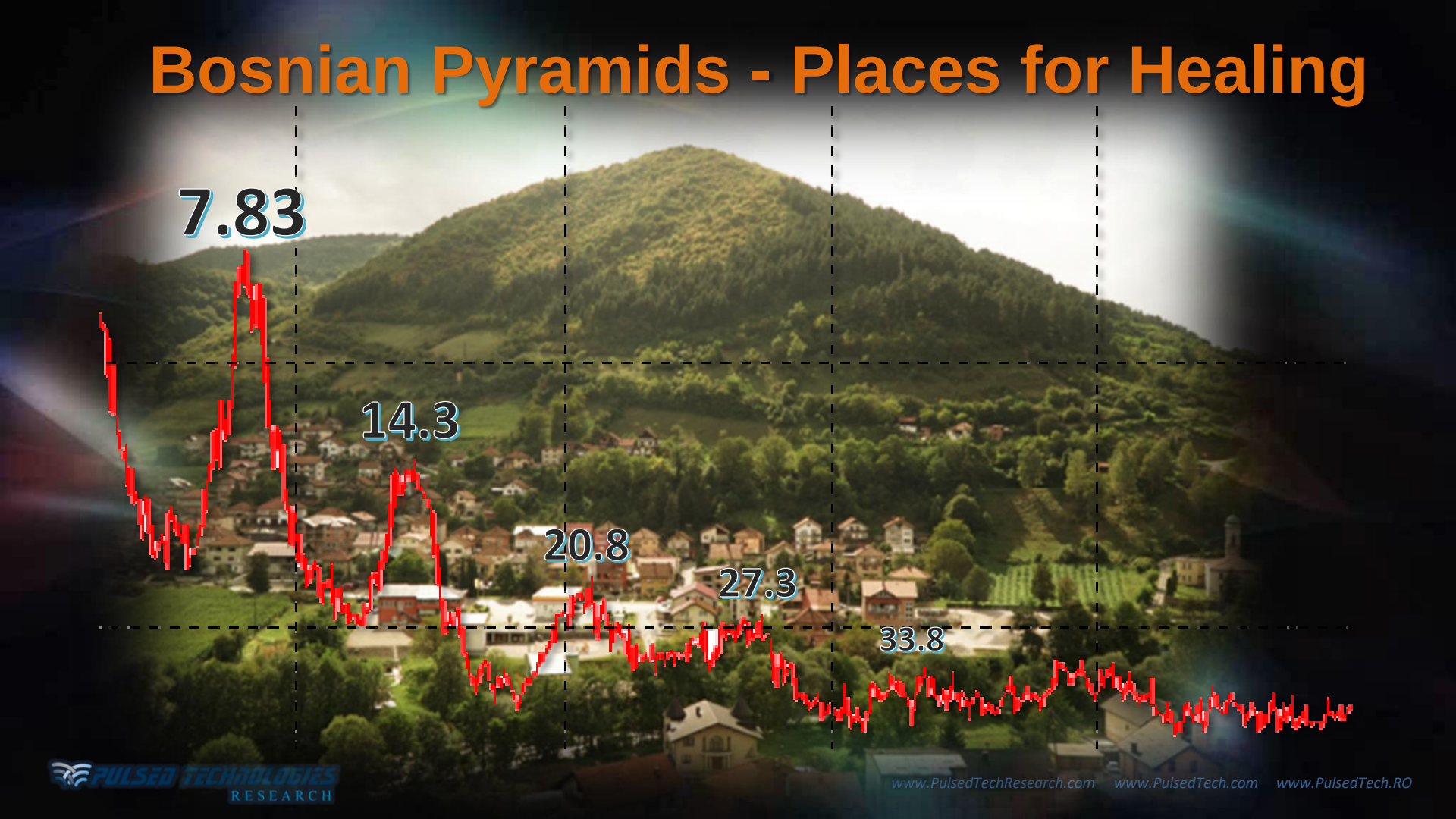
Bosnian Pyramids - Places for Healing



Mind-Body-Spirit Relationships

- This IS,
  (in at least part),
  the “connection” between
  the MIND-BODY-SPIRIT
  aspects of our lives!

The Pioneers

Dr. Albert Szent-Gyorgyi

Dr. Robert O Becker

BRAINWAVE STATES

ANESTHESIA (Induced)
REPAIR &
REGENERATION

SLEEP

Dr. Ralph Gerard

Dr. Olena Bukalo

PULSED TECHNOLOGIES RESEARCH

The Pioneers

Dr. Albert Szent-Gyorgyi

BRAINWAVE STATES

SLEEP

Dr. Ralph Gerard

The Pioneers

Dr. Robert O Becker

ANESTHESIA (Induced)
REPAIR &
REGENERATION

Dr. Olena Bukalo

Healing and Repair
Voltage Level
Current Reversal
Mental Reset

PULSED TECHNOLOGIES RESEARCH

Pineal Gland – Creator of Hormones, Feelings, and (maybe even) States of Consciousness

Repair & Regeneration

Anti-Oxidants

Pineal Gland

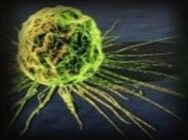
Sleep

Serotonin & Other Messenger Molecules

PULSED TECHNOLOGIES RESEARCH

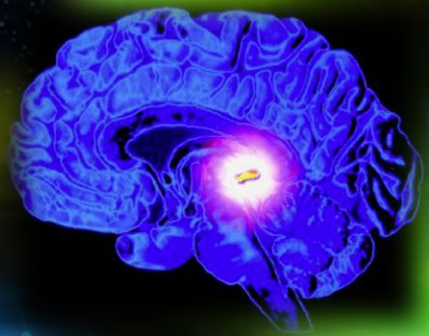
Natural Healing from Within

Day (Active) Mode

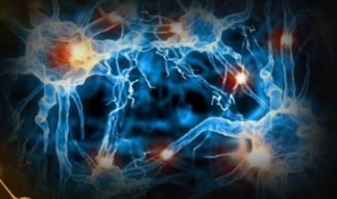


Anti-Oxidants/
Free Radical Scavenger

Pineal Gland



Repair & Regeneration

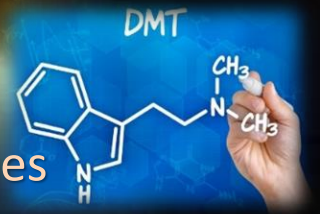


VSG

[replace with HER version photo]

Sleep

Serotonin & Other
Messenger Molecules



Night (Sleep) Mode

PULSED TECHNOLOGIES RESEARCH

VSG is a supplemental tool for when you cannot access the natural rhythms of life!

[replace with HER version photo]

VSG

Day Mode

Night Mode

Helping to restore access to the natural rhythms for natural healing and mental health

PULSED TECHNOLOGIES RESEARCH

The DISRUPTORS

Sleep

Brainwave States

Toxic Foods & Environment

The "Disrupted"

Cellular Energy

Pineal Gland

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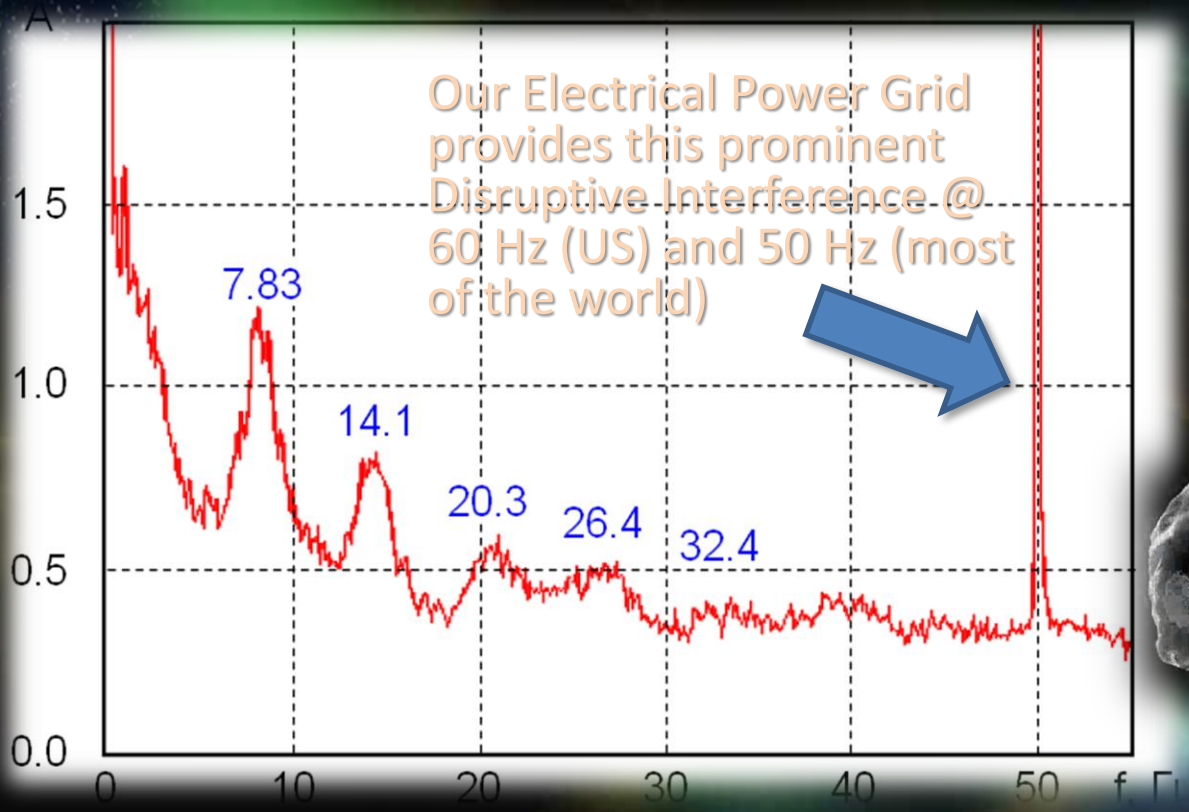
Electrical Power as a DISRUPTOR



PulsedTech/HER VitaSet Generator

Helping to restore access to the Earth's rhythms for natural healing and mental health

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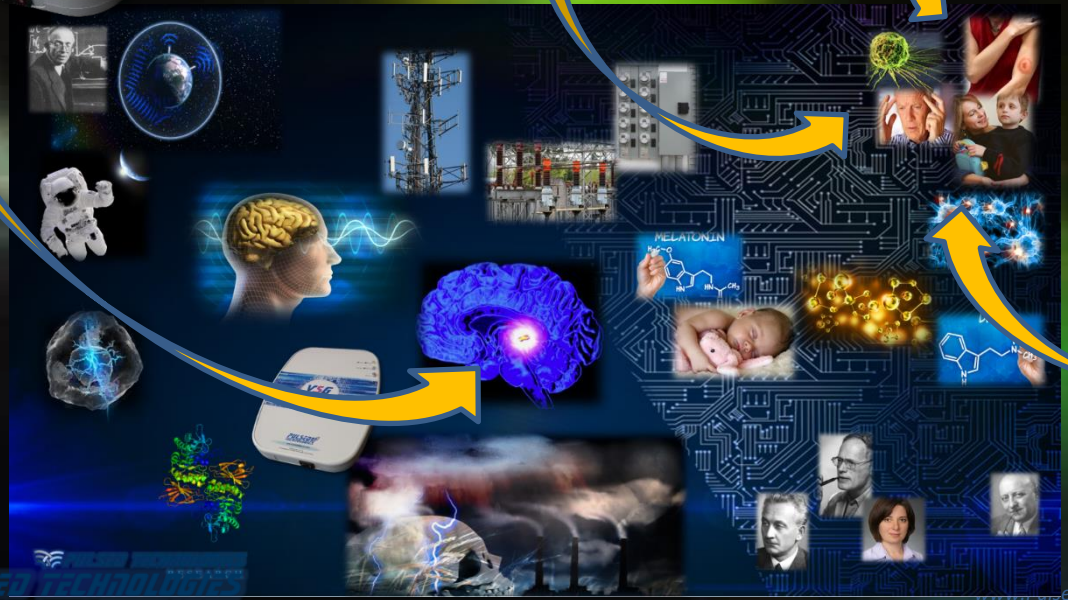
Everyone Needs One or the Other

VSG



Or BOTH !

PULSED TECHNOLOGIES RESEARCH

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Mind
Body
Spirit

What is ENTRAINMENT?

- Entrainment is a principle of physics.
- It is defined as the synchronization of two or more rhythmic cycles.
- The principle of entrainment appear in chemistry, neurology, biology, pharmacology, medicine, astronomy and more.

- *Case in point: while working on the design of the pendulum clock in 1656, Dutch scientist Christian Huygens found that if he placed two unsynchronized clocks side by side on a wall, they would slowly synchronize to each other, In fact the synchronization was so precise not even mechanical intervention could calibrate them more accurately.*

Reference: Transparentcorp.com

Hemi-Sync$_{tm}$ – Binaural Beat

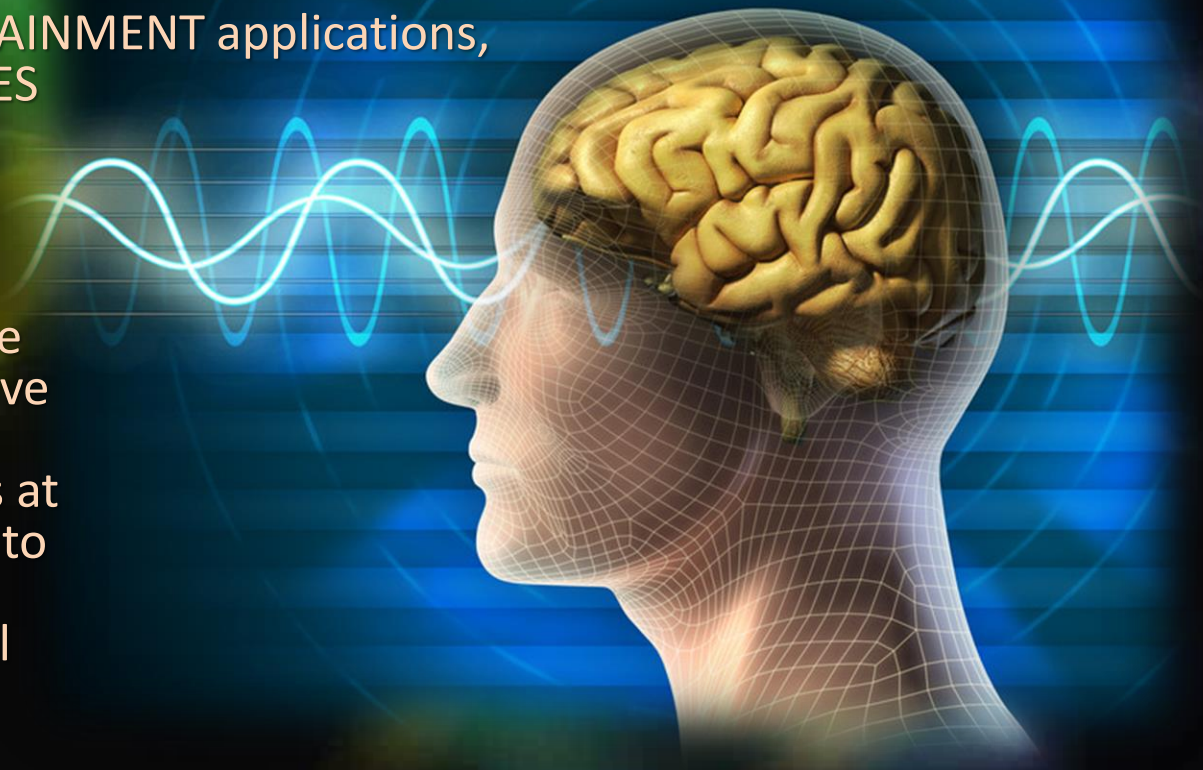
- The target range for intended entrainment is much lower than perceivable sound frequencies.

- The Brain interprets the difference of the 2 distinctly different signals as a single frequency DOWN in the intended target range.

Practical Application

- When using ENTRAINMENT applications, we use SINE WAVES

- **Sine Waves** are the cleanest of the wave forms and do not contain harmonics at other frequencies to confuse the entrainment signal



Entrainment Transitions

- Transitions from one state to another is best done in calculated steps

Guided Entrainment to Specific Brainwave States

27 Hz and UP

Γ γ Gamma

B β Beta

12 - 27 Hz

ACTIVE MODE

A α Alpha

8 - 12 Hz

SLEEP MODE

.2 - 3 Hz

Δ δ Delta

Θ θ Theta

3 - 8 Hz

PULSED TECHNOLOGIES RESEARCH

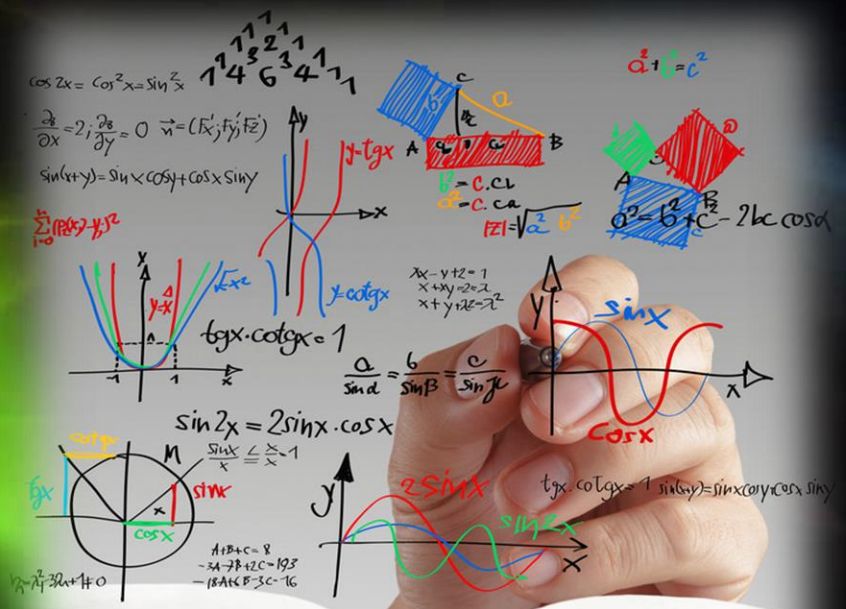
Brainwave State GAMMA – 27 Hz – and UP

Γ γ

Gamma

- Gamma is associated with the **formation of ideas**, **language and memory processing**, and various types of **learning**.

- Gamma waves have been shown to disappear during deep sleep induced by anesthesia, but return with the transition back to a wakeful state.



Reference: Transparentcorp.com

Brainwave State BETA – 12 Hz – 27 Hz

- Wide awake.
- This is generally the mental state most people are in during the day and most of their waking lives. Usually, this state in itself is uneventful, but don't underestimate its importance.

- Many people lack sufficient beta activity, which can cause mental or emotional disorders such as depression and ADD. and insomnia.
- And low SMR production (a sub-range of beta at 12-15hz) may be related to insomnia.
- **Stimulating beta activity can improve emotional stability, energy levels, attentiveness and concentration.**

Reference: Transparentcorp.com

Brainwave State ALPHA – 8 Hz – 12 Hz

- Awake but relaxed and not processing much information. When you get up in the morning and just before sleep, you are naturally in this state. When you close your eyes your brain automatically starts producing more alpha waves.

- Many studies monitoring the EEG activity of experienced meditators have revealed strong increases in alpha activity.

- Alpha activity has also been connected to the ability to **recall memories, lessened discomfort and pain, and reductions in stress and anxiety.**

Reference: Transparentcorp.com

Brainwave State THETA – 3 Hz – 8 Hz

Theta

- Light sleep or extreme relaxation

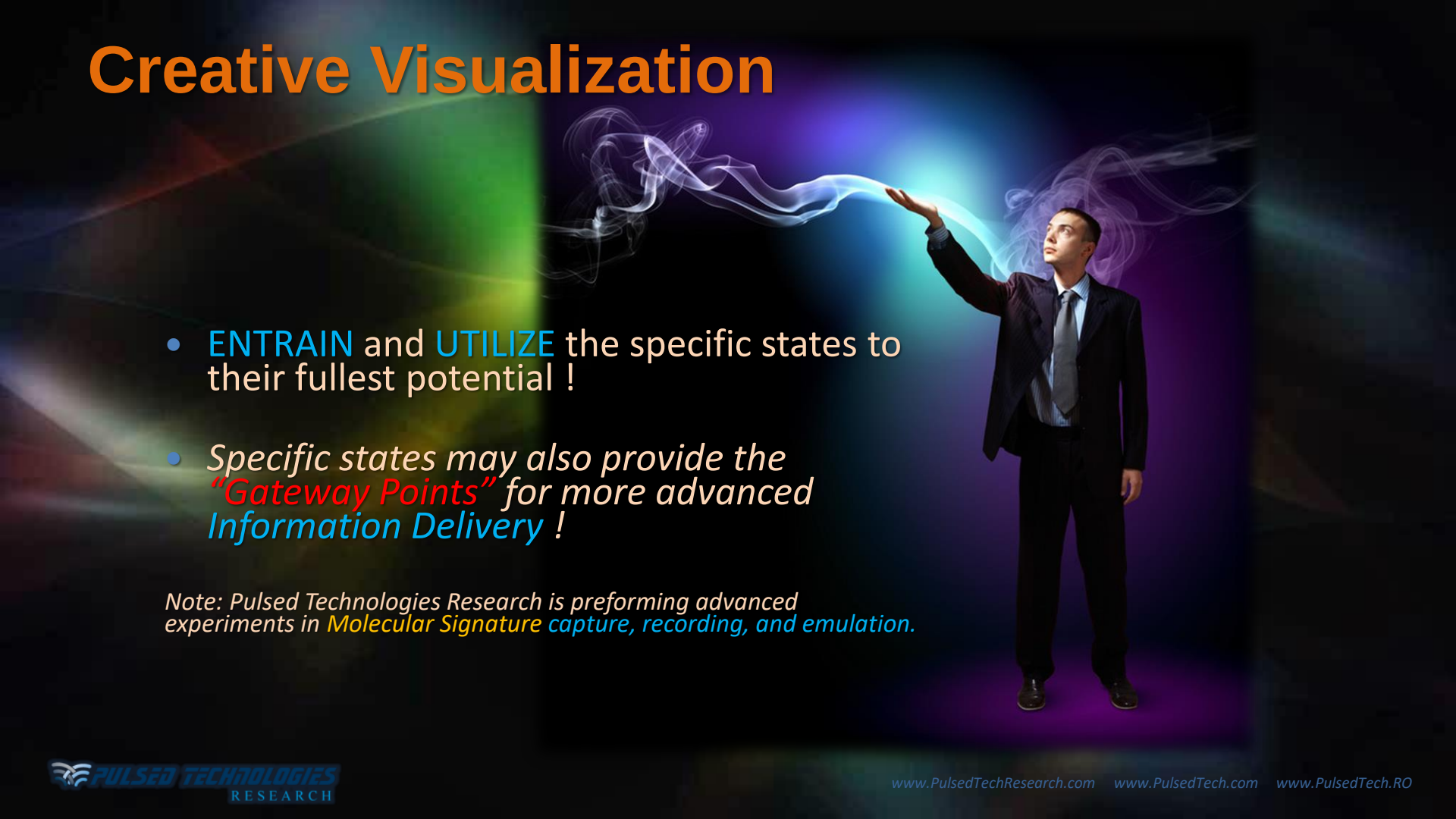
- Theta is also a very **receptive mental state** that has proven useful for **hypnotherapy**, as well as **self-hypnosis** using recorded **affirmations and suggestions**.

Reference: Transparentcorp.com

Brainwave State DELTA – .2 Hz – 3 Hz

- Deep, dreamless sleep.
- Delta is the slowest band of brainwaves.
- When your dominant brainwave is delta, your body is **healing itself** and **"resetting" its internal clocks**.
- You do not dream in this state and are completely unconscious.

Creative Visualization



- ENTRAIN and UTILIZE the specific states to their fullest potential !

- *Specific states may also provide the "Gateway Points" for more advanced Information Delivery !*

Note: Pulsed Technologies Research is preforming advanced experiments in Molecular Signature capture, recording, and emulation.

Gateway Points – Complex Information

- Bringing the subject to the appropriate brainwave state MAY make receptivity of complex biological information more readily available
- Information embedded in messenger molecules, medicinal plants, even prescription pharmaceuticals “might” be conveyed
- Effects from these messages may be delivered without the toxic effects normally associated with the actual pharmaceuticals
- **Molecular EMULATION** may be possible for substances difficult or even illegal to obtain.

Entrainment Transitions

- Transitions from one state to another is best done in calculated steps

Brainwave End-Point

- The target endpoint can be whatever the user desires

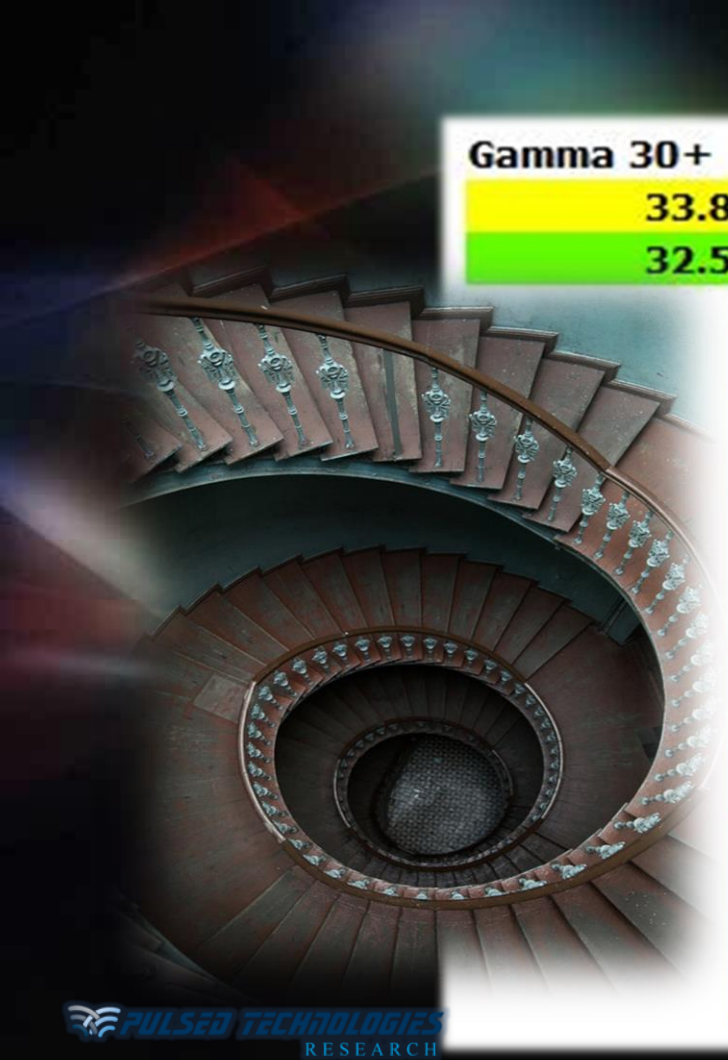
Entrainment Protocols

- Pulsed Technologies Brainwave Entrainment Protocols will be released in association with H.E.R. Technology and the upcoming SAL-369 software suite

- The protocols will currently run on existing Pulsed Technologies PFG Lab control software and will be released in a Mind-Body-Spirit Library available through H.E.R.

- ***RELEASE NOVEMBER 2014***

Entrainment Steps

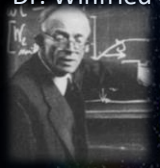


Gamma 30+	Beta 30>13	Alpha 13>8	Theta 8>4	Delta 4>.2
33.8	**27.3**	10.725	**7.83**	3.915
32.5	**26.4**	10.575	**7.8**	3.9
	25.35	10.4	7.15	3.575
	24.375	10.15	7.05	3.525
	20.8	8.45	6.825	3.4125
	20.475	8.125	6.6	3.3
	20.3		5.8725	2.6
	19.8		5.85	2.5375
	16.9		5.2	1.9575
	16.25		5.075	1.95
	15.6		4.225	1.7875
	15.225		4.0625	1.7625
	14.3			0.97875
	14.1			0.975
	13.65			
	13.2			

Gateway Points – Complex Information

- Astral Projection
- Creative Thought
- Enkephalin Production (Pain Killers)
- Euphoria (Endorphin Production)
- Meditation
- Regeneration
- Relaxation
- Relaxed Breathing
- SoC - State of Consciousness
- Sound Sleep

Relationships & Connections


Dr. Winfried Otto Schumann


Schumann Resonance


Electro-Pollution

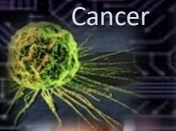
Wireless

Smart-Meters

Cell Phones

Wi-Fi


"Dirty" Power


Cancer


Alzheimer

Anti-Oxidants


Lyme


Autism


Astronauts/Cosmonauts

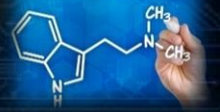
Spacecraft/Spacesuits

Brainwave States


Melatonin


Repair & Regeneration


Serotonin & Other MM


DMT

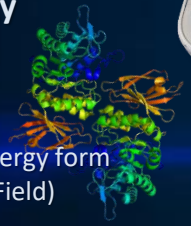

Cellular Energy

VSG


Pineal Gland


Sleep

Anesthesia (Induced)


Enzymes

(Capture of Free Energy form Oscillating Electric Field)


Toxic Foods & Environment


Dr. Robert O. Becker

Dr. Ralph Gerard


Dr. Olena Bukalo

Dr. Albert Szent-Gyorgyi

PULSED TECHNOLOGIES RESEARCH


7 CHAKRA
Pulsed Technologies
PULSED TECHNOLOGIES
RESEARCH
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www.PulsedTech.com
www.PulsedTech.RO

Education / Enlightenment / Sharing

- Different personal paths to the ideal “destination”

Chakra via Entrainment

172.06

221.23

141.27

136.10

126.22

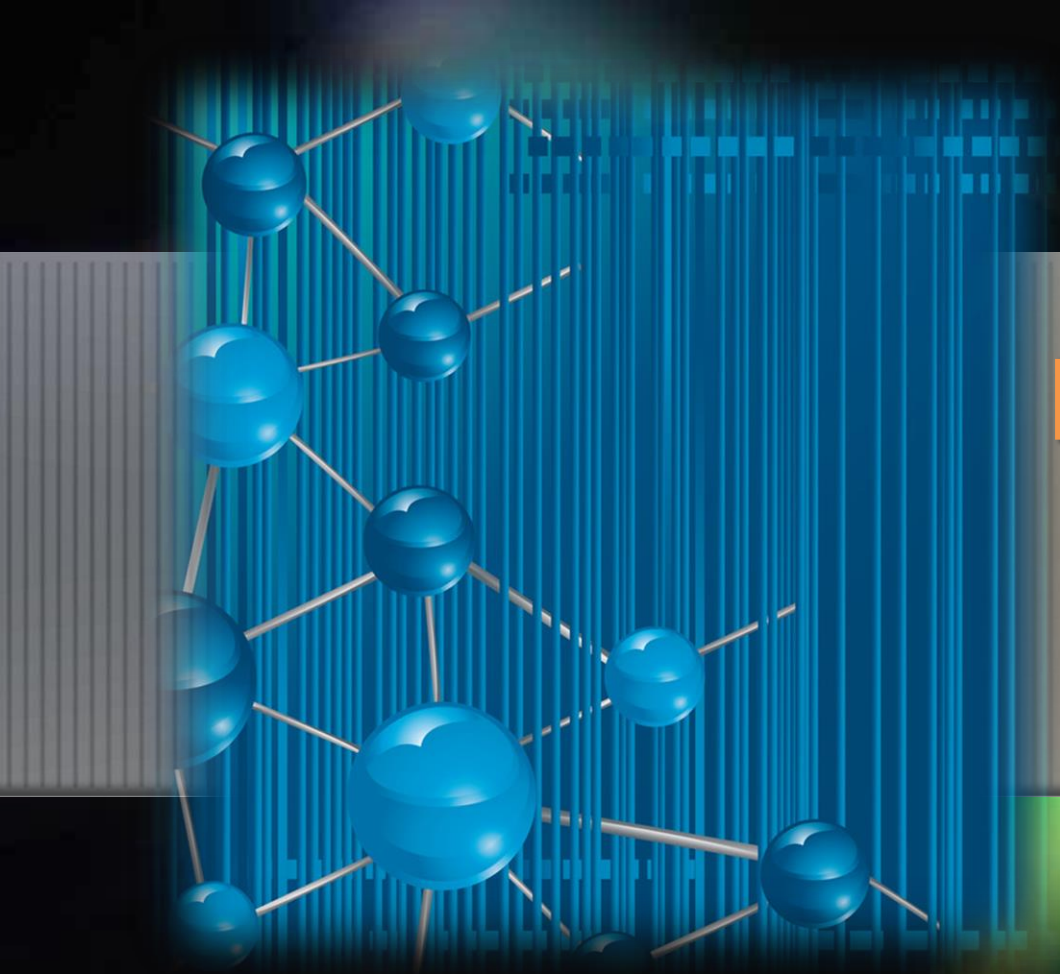
210.42

194.18

Chakra Balancing

- The Chakra balancing and stimulating protocols will currently run on existing Pulsed Technologies PFG Lab control software and will be first released in a Mind-Body-Spirit Library available through H.E.R.
- ***RELEASE NOVEMBER 2014***

MOLECULAR EMULATION



MOLECULAR EMULATION

Pulsed Technologies

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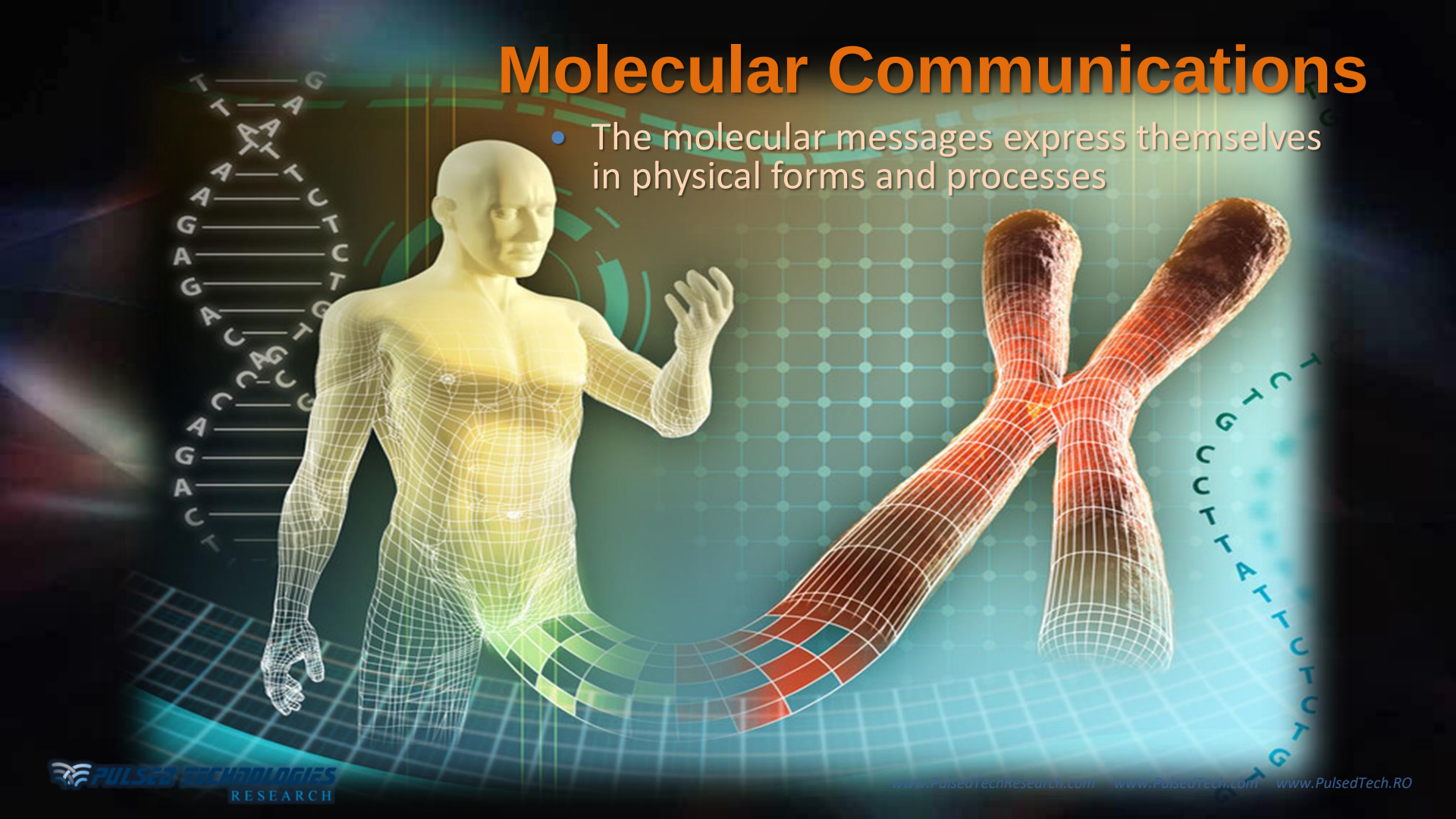
Molecular Communications

- The molecular messages express themselves in physical forms and processes



P.M.E.

Polymannan Extract

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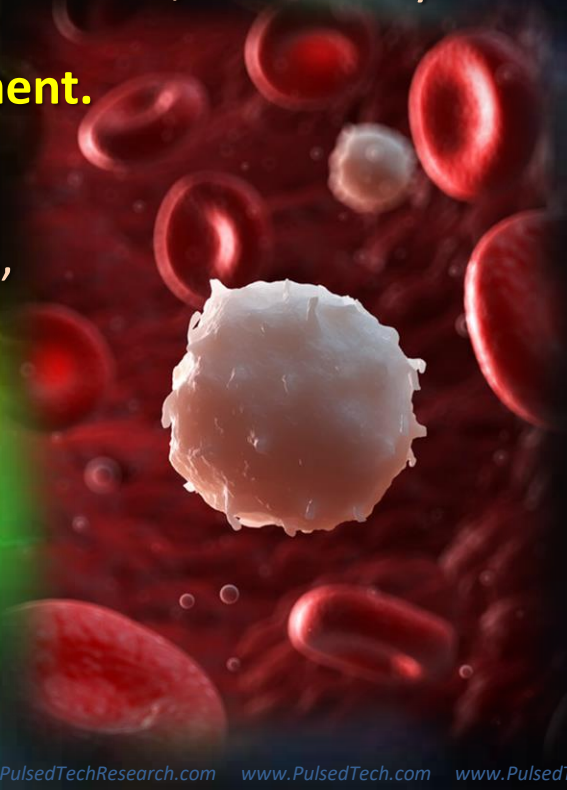
Albarin – P.M.E.

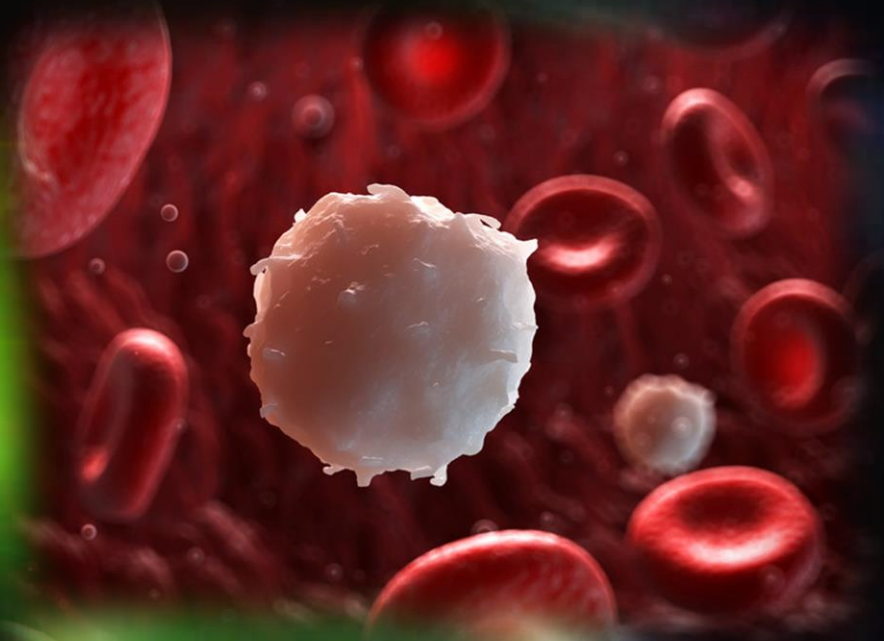
- According to an article by John Hammell in the April 2002 *Life Extension,* DiStefano and Mayer did no advertising and charged only $1,200 for a series of forty treatments, or as many as the patient needed for remission —
  less than the cost of one chemotherapy treatment.
- They turned no one away for financial reasons.
- They had a **remission rate of 94%** in the first hundred patients, who came from hospices, and 80% overall.

European Patent
2661274A1

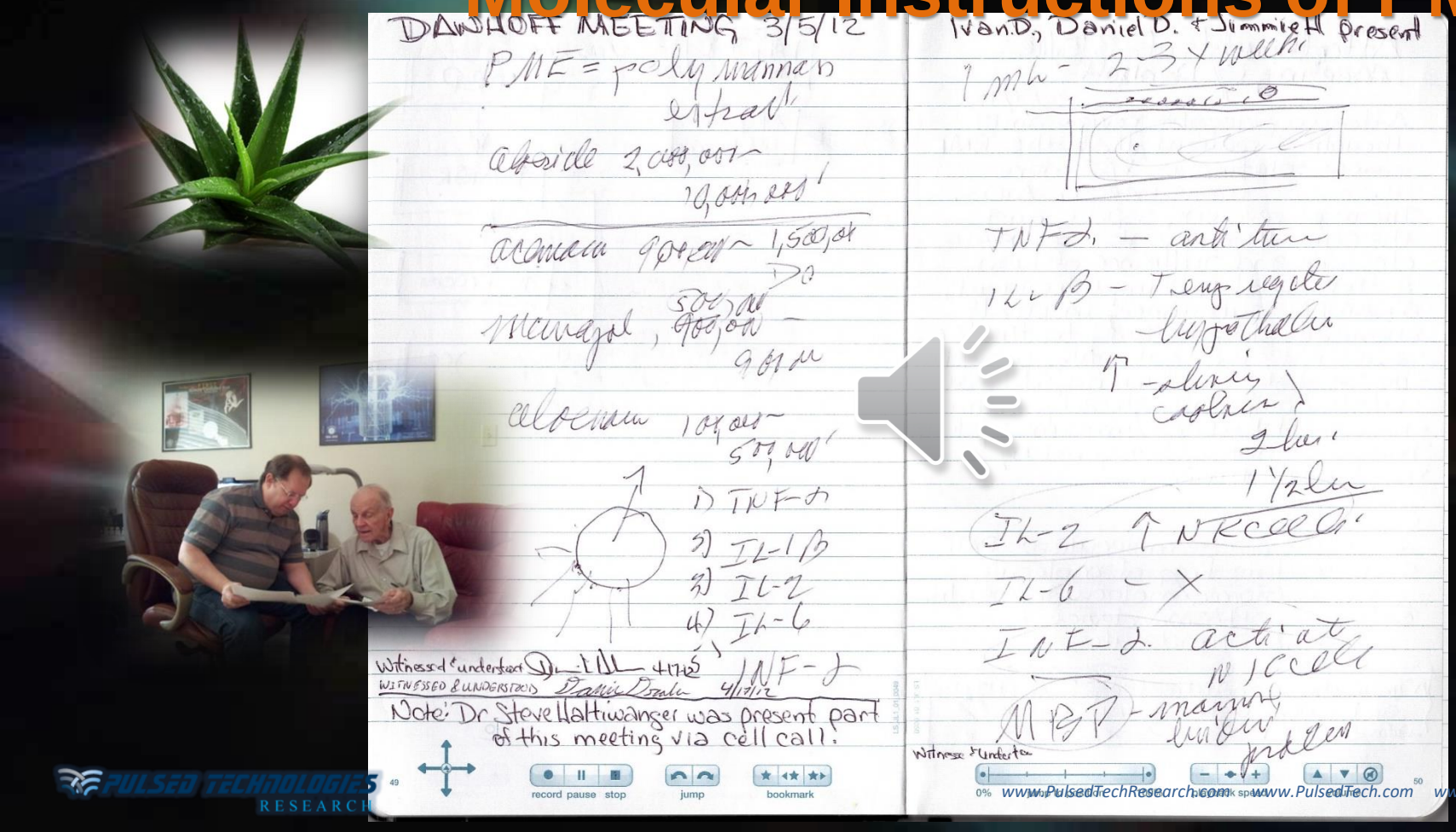


P.M.E. Modis Operandi

- Dr. Ivan Danhof describes the mechanism and messaging going on to affect immune boost, anti-carcinogenic action and, metabolic instruction given by this amazing long chain sugar.



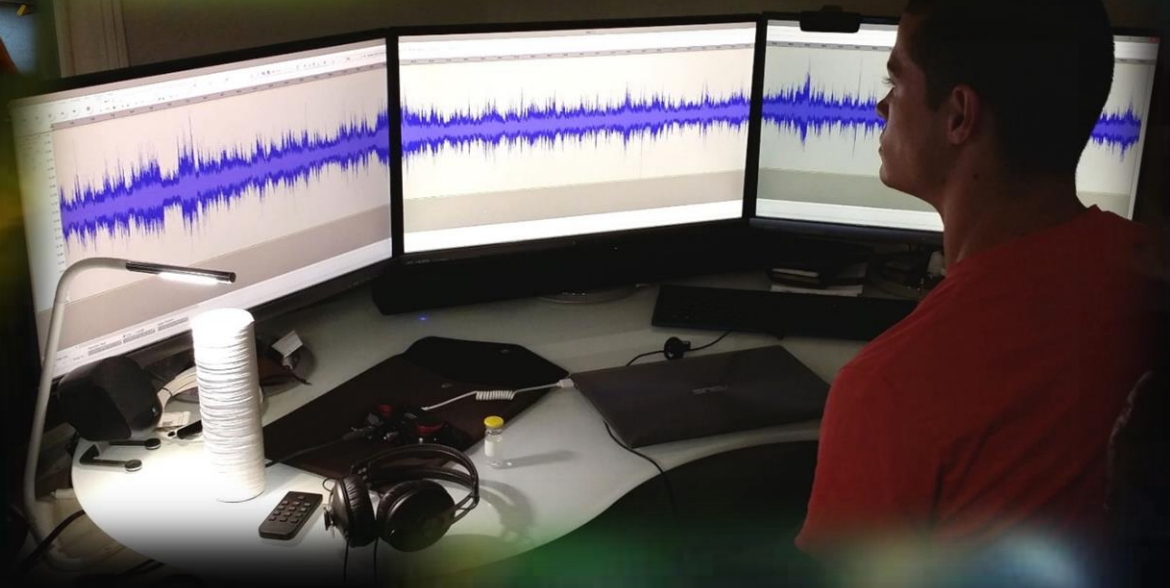
Molecular Instructions of PME



Molecular Signature & Instructions

- PulsedTech Research is currently working to capture the embedded message of certain signaling molecules to ideally emulate these complex messages when the drug or substance is not available

Dr. Ivan Danhof, MD, PhD, creator of "Albarin" (PME) with PulsedTech engineer Thomas Drake discussing information capture and signaling messages being conveyed.



Molecular Communications

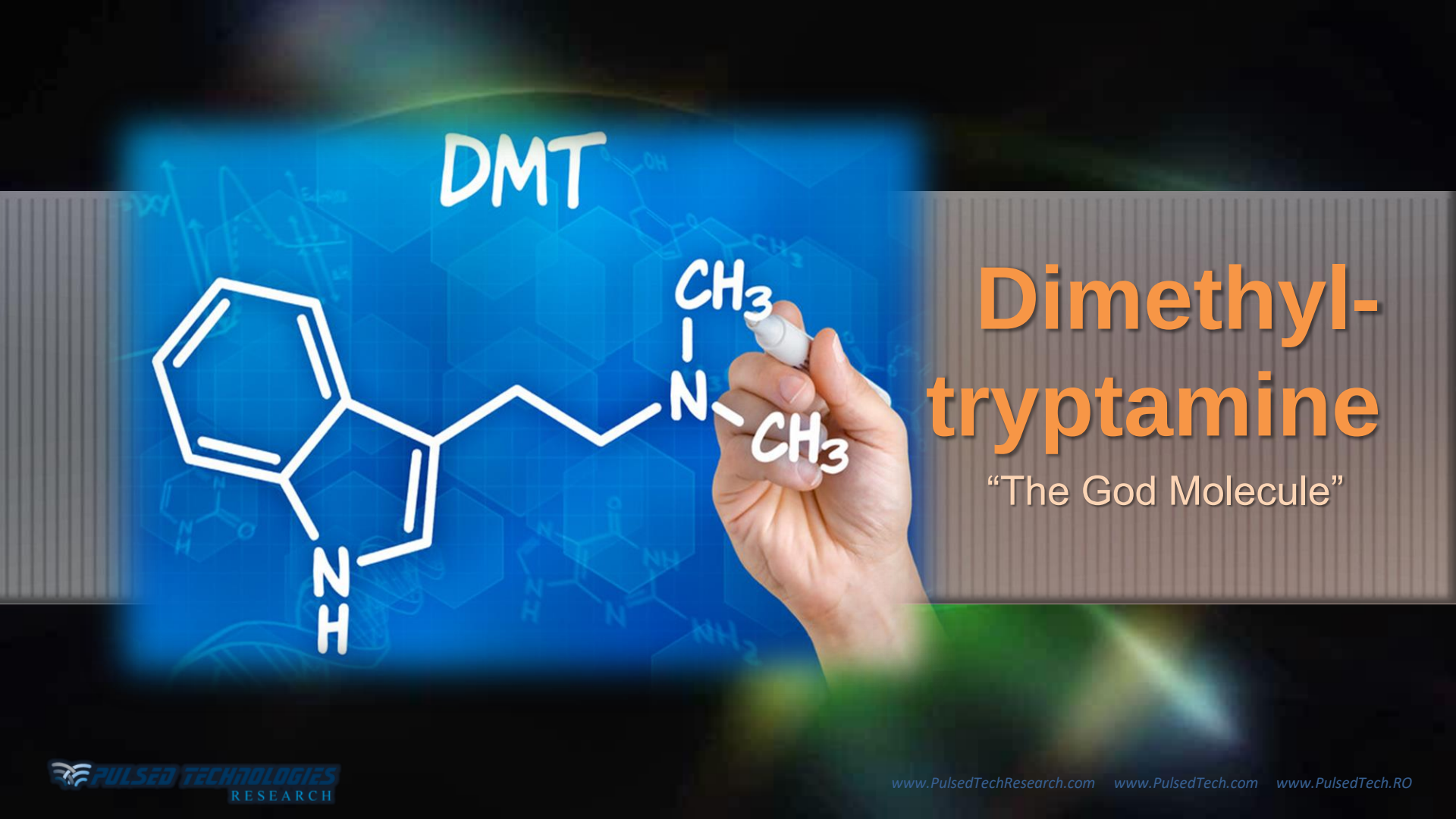
- It is important to note that while what is being presented here for your perception is a sound file ….
- The actual message or instruction is **NOT an "AUDIBLE" energy**

EPITHALON

Pulsed Technologies

Pineal Gland & Epitalon

- It is important to



Dimethyl-tryptamine

"The God Molecule"

LIFE EXTENSION

Pulsed Technologies

PULSED TECHNOLOGIES RESEARCH

www.PulsedTechResearch.com www.PulsedTech.com www.PulsedTech.RO

Life Extension

The Choices are YOURS!

- **Raw Foods** = substances for rapid cell repair
- **Supplemental Energy** = more efficient metabolism and internal communications
- **Target Pathogens** = get rid of the physical/chemical drain on YOUR bodily resources

Longevity, Aging & Healing

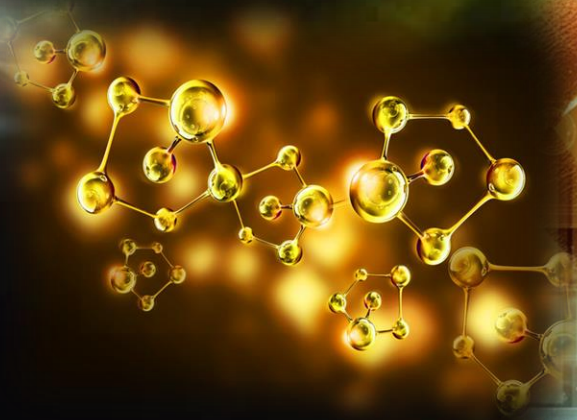
- In both aging (Barker, 1983) and degenerative conditions cells lose their membrane charge. Photo and frequency therapy has the ability recharges cell membranes.

- The cells can then use this energy in many ways; but most especially in production of ATP, the “energy currency” of the living tissue.

- In restoring the charge of the cells that are functioning sub-optimally, the body can be moved naturally towards a state of health, which is manifested by faster tissue regeneration (Vodovnik, 1992).

Aging Reversal

- New synthetic molecules, versions of natural tera-peptides show increasing promise they may be utilized to deliver instruction signals via the DNA to initiate repair of failing or broken functions.
- i.e. Telomere repair



PLANT GROWTH

Pulsed Technologies

Life Extension

The Choices are YOURS!

- **Raw Foods** = substances for rapid cell repair
- **Supplemental Energy** = more efficient metabolism and internal communications
- **Target Pathogens** = get rid of the physical/chemical drain on YOUR bodily resources

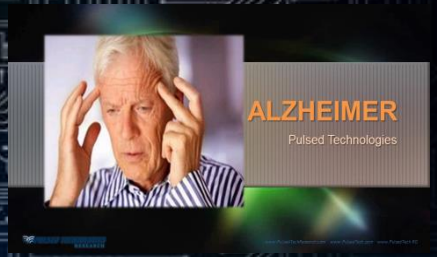
Imprinter Colloidal (iCS) Silver Water

- The suffering plant has exhibited explosive regeneration and phenomenal new growth with simply the application of imprinted/energized (likely restructured) water/CS media in this simple experiment by Engineering Associate Daniel Drake

< BEFORE

AFTER >

www.PulsedTechResearch.com



PULSED TECHNOLOGIES RESEARCH

PFG2z or VSG

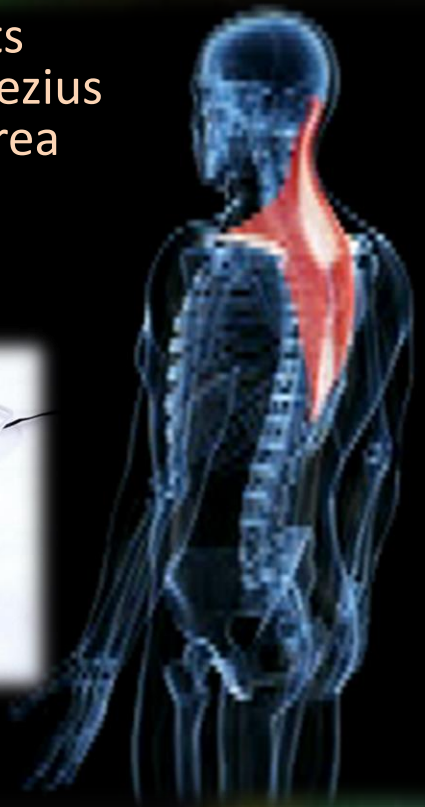
- **P**recision **F**unction **G**enerator

Almost everyone NEED a PFG or VSG both NOW or IN THE FUTURE!

- **V**ita**S**et **G**enerator

Practical Application

- Application Points
  Left & Right Trapezius
  Shoulder-Neck area



- PFG2Z preferred Application Method
- **DO NOT** PLACE ELECTRODES ON HEAD !

Chakra via Entrainment

172.06

221.23

141.27

136.10

126.22

210.42

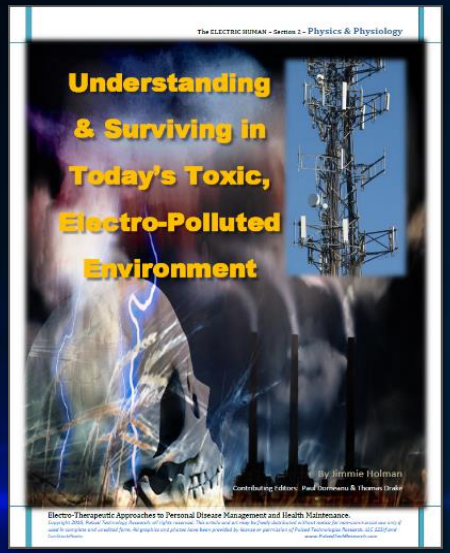
194.18

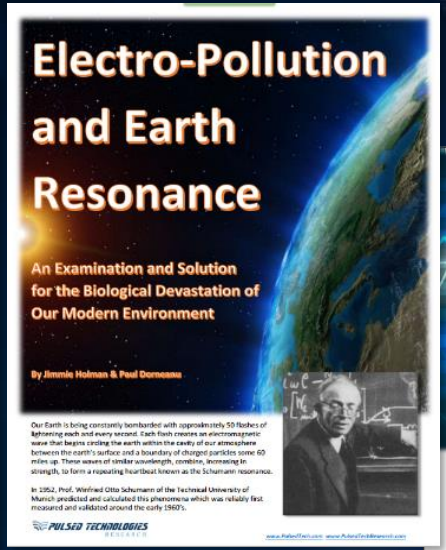
Chakra Balancing

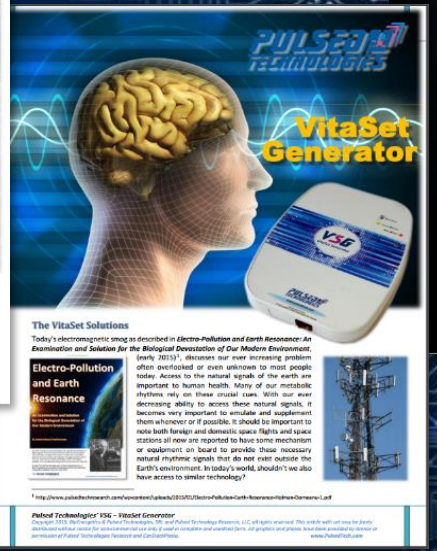
- The Chakra balancing and stimulating protocols will currently run on existing Pulsed Technologies PFG Lab control software and will be first released in a Mind-Body-Spirit Library available through H.E.R.
- ***RELEASE NOVEMBER 2014***

www.PulsedTechResearch.com

http://www.pulsedtechresearch.com/understanding-surviving-in-todays-toxic-electro-polluted-environment/
http://www.pulsedtechresearch.com/electro-pollution-and-earth-resonance/
http://www.pulsedtechresearch.com/wp-content/uploads/2016/01/VitaSet-Introduction-Operation.pdf
http://www.pulsedtechresearch.com/anatomy-inspiration-for-design-of-todays-vitaset/





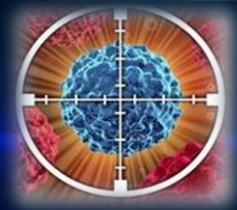


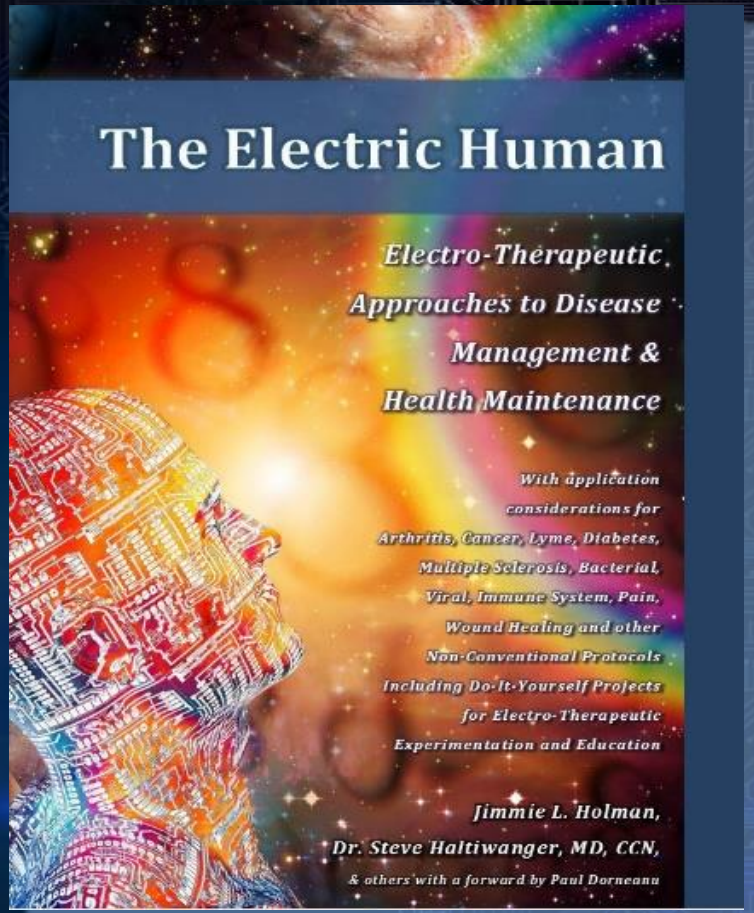
PULSED TECHNOLOGIES RESEARCH

www.PulsedTechResearch.com/the-electric-human/

Jimmie Holman & Dr. Steve Haltiwanger

A wealth of information in one place ….. FREE!





PULSED TECHNOLOGIES RESEARCH

A Sincere

Thank You

... from the PulsedTech Team

PULSED TECHNOLOGIES

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jimmie@pulsedtech.com

PULSED TECHNOLOGIES RESEARCH

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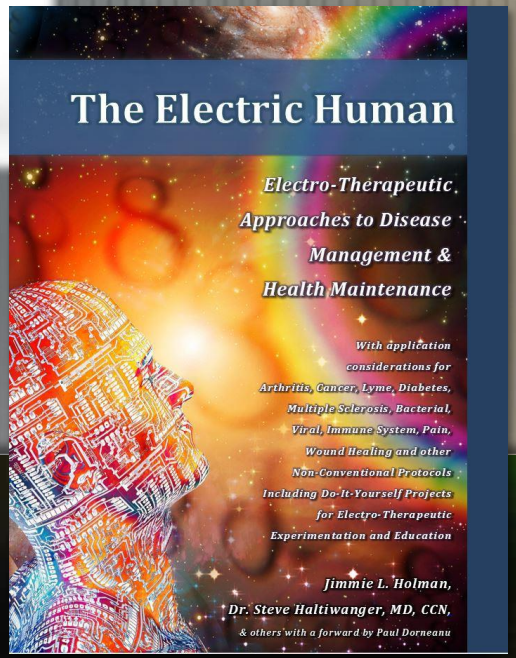


Questions & Answers

- Section 3 has an especially good "Q&A" area as well "Strategies and Considerations Briefs"

Rife's Strategy

Tumor Preparation

- Rife meticulously prepared and recorded samples for study

Frequency Adjustment

- Rife would adjust his frequency generator to the known MOR (Mortal Oscillatory Rate)

Observation of Destruction

- Rife would monitor the controlled destruction of the targeted pathogens

- The observer would witness the light-stained pathogen transform from a glowing violet to a dead black when the task was accomplished

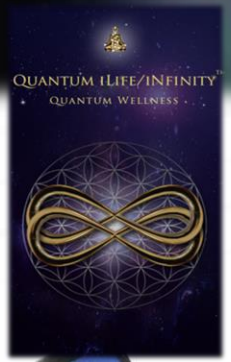
PFG2z

- Precision Function Generator

Also Includes:

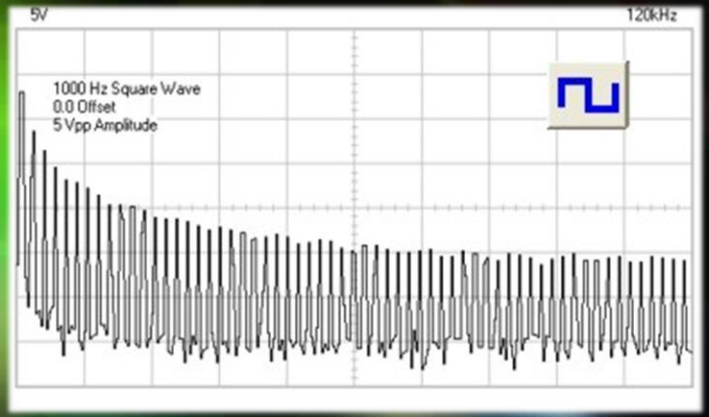
- Power Supply
- USB Interface, Electrode & Extension Cables
- Reusable Electrode Pads &
- PFG Lab software

Ideal Application



Q&A – Plasma / Contact Frequencies

- **What are “Higher Frequencies”?**
- The Higher Frequencies, as we name them, are harmonics (or multiples) of the lower frequencies, usually above 20,000 Hz. to well over 100,000 Hz. Pulsed Technologies equipment both plasma and contact operate in these regions of the spectrum.
- Most available (competitive) plasma equipment is of the EMEM type and has a vastly limited frequency spectrum even less than the audio spectrum. Some claim 10-15,000 Hz but in actuality, effective emission is being stressed at only a few (3-4) thousand Hz.

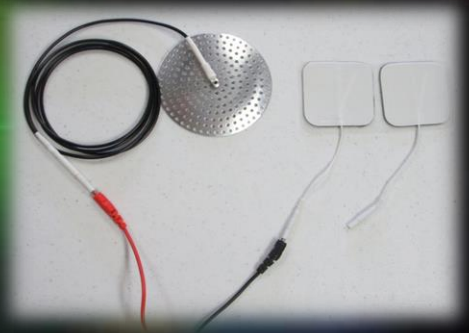


iCS Accessory

- Extremely High-Grade Colloidal Silver Solution may be generated with any of the Pulsed Technologies PFG or newer P3pro devices and the ICS Accessory.
- iCS solution becomes the “media” for user-defined IMPRINTABILITY of custom protocols.
- Custom Protocol Imprinting occurs only AFTER initial CS solution is manufactured.

Immerse-able Electrode

- May be used as an electrode in a footbath for excellent large area conductivity
- Or in a moist/wet cloth for localized application to wound area
- Replaces one of the conventional electrodes



Hand or Foot Bath

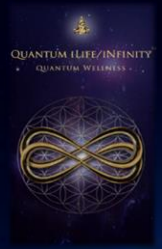
- The indirect distributed contact via heavily salted conductive water provides simultaneous conductivity through all meridian points.

P3

- The P3 Requires the use of a separate PFG series device for proper operation.
- Required cables are supplied.

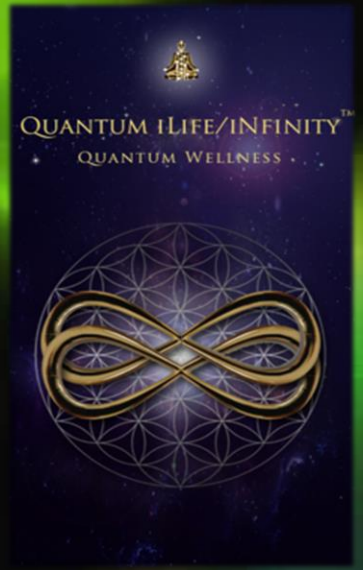
- This configuration allows the use of the PFG to be also utilized for other purposes (i.e. “contact method”, production of “imprintable colloidal silver”, etc

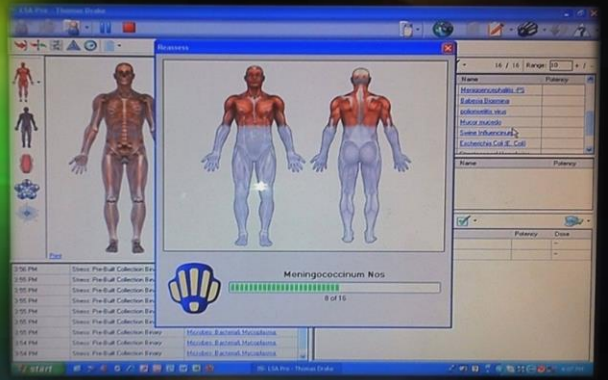
Diagnostic Assessment



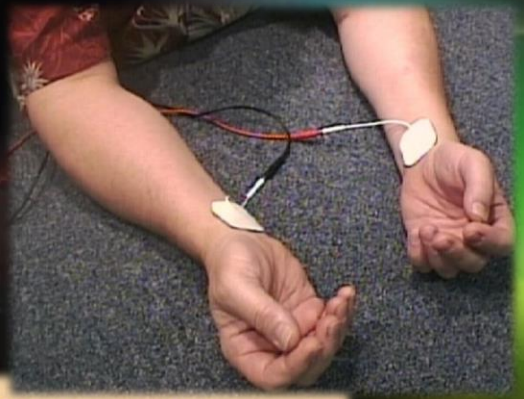
QL / Practitioner Assessment

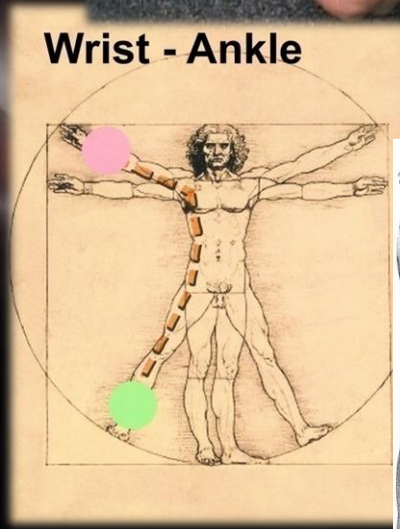
- Practitioner assessment aids can be instrumental in quickly determining issues needing to be addressed including “frequency supplementation” and targeting applications or protocols

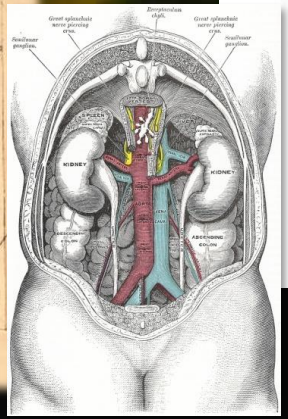


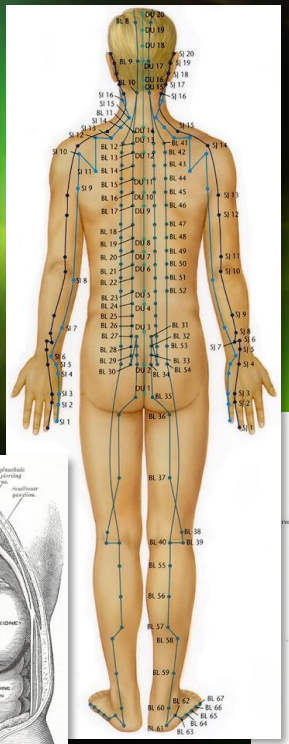


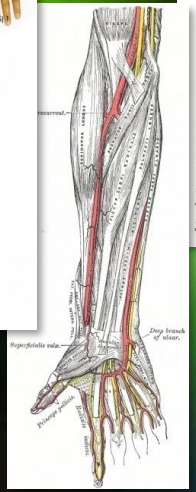
Delivery Considerations

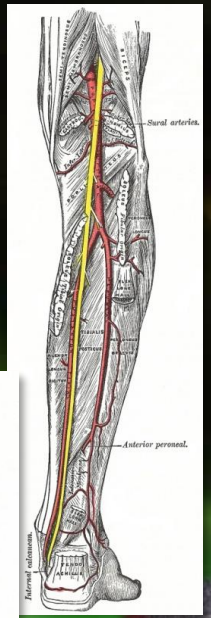


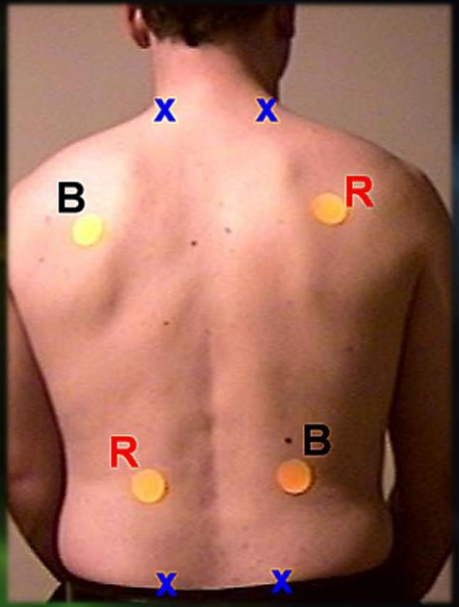












Practical End-User Application

- Client can use preprogrammed system in the privacy of their own home
- May be utilized while reading, watching TV etc. so as to minimize impact on daily schedule
- Daily protocol commitment and regular reporting and/or feedback to practitioner can be done on the clients schedule
- Data and comments being “collected” via txt messages at the practitioner office can be addressed on his schedule

Commitment & Monitoring

- It is CRITICAL when dealing with Lyme and co-infections that **CONSTANT DAILY PROTOCOLS** be maintained!!!

  TARGET ISSUES / PATHOGENS
  PREVENT MUTATIONS

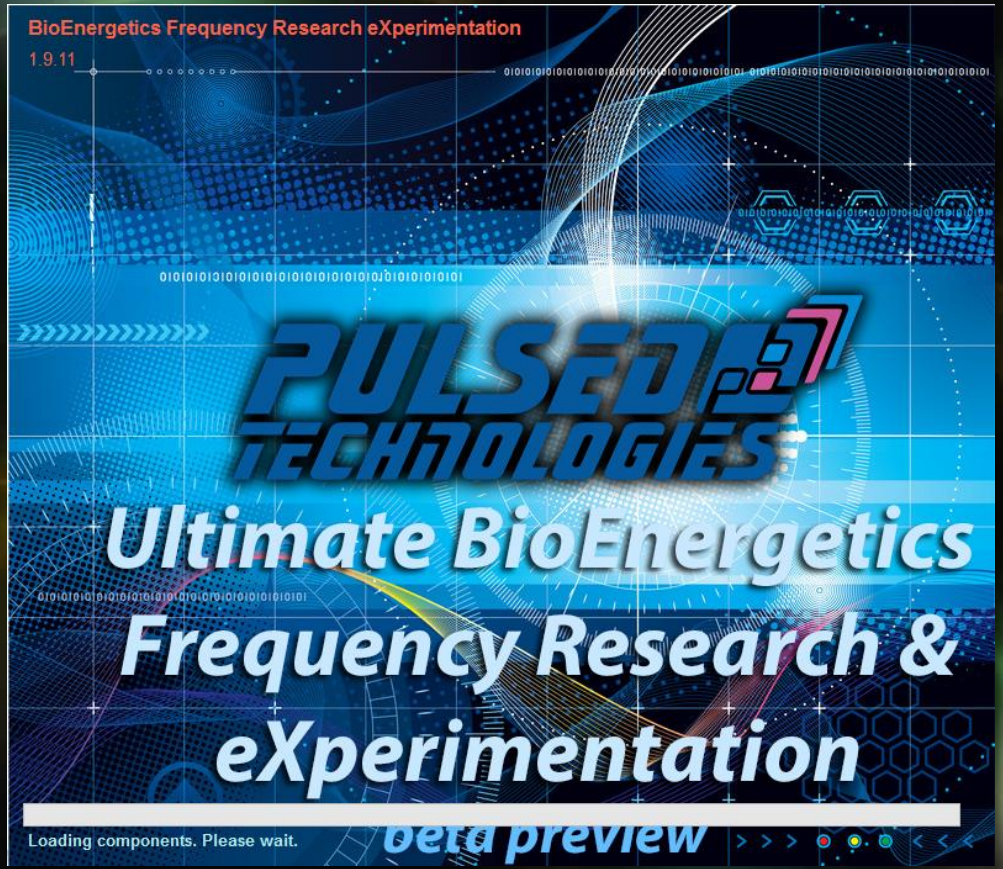
- Regular **MONITORING** and **PROGRESS ASSESSMENTS** by a knowledgeable practitioner

  NEEDED ADJUSTMENTS
  SUPPLEMENTATION (to optimize protocol effectiveness)

- Much of this CAN be done remotely with proper equipment and online connectivity

  Regular Biofeedback Assessment & Analysis
  PFG LAB REMOTE SUPPORT

PFG Lab2


BioEnergetics Frequency Research eXperimentation
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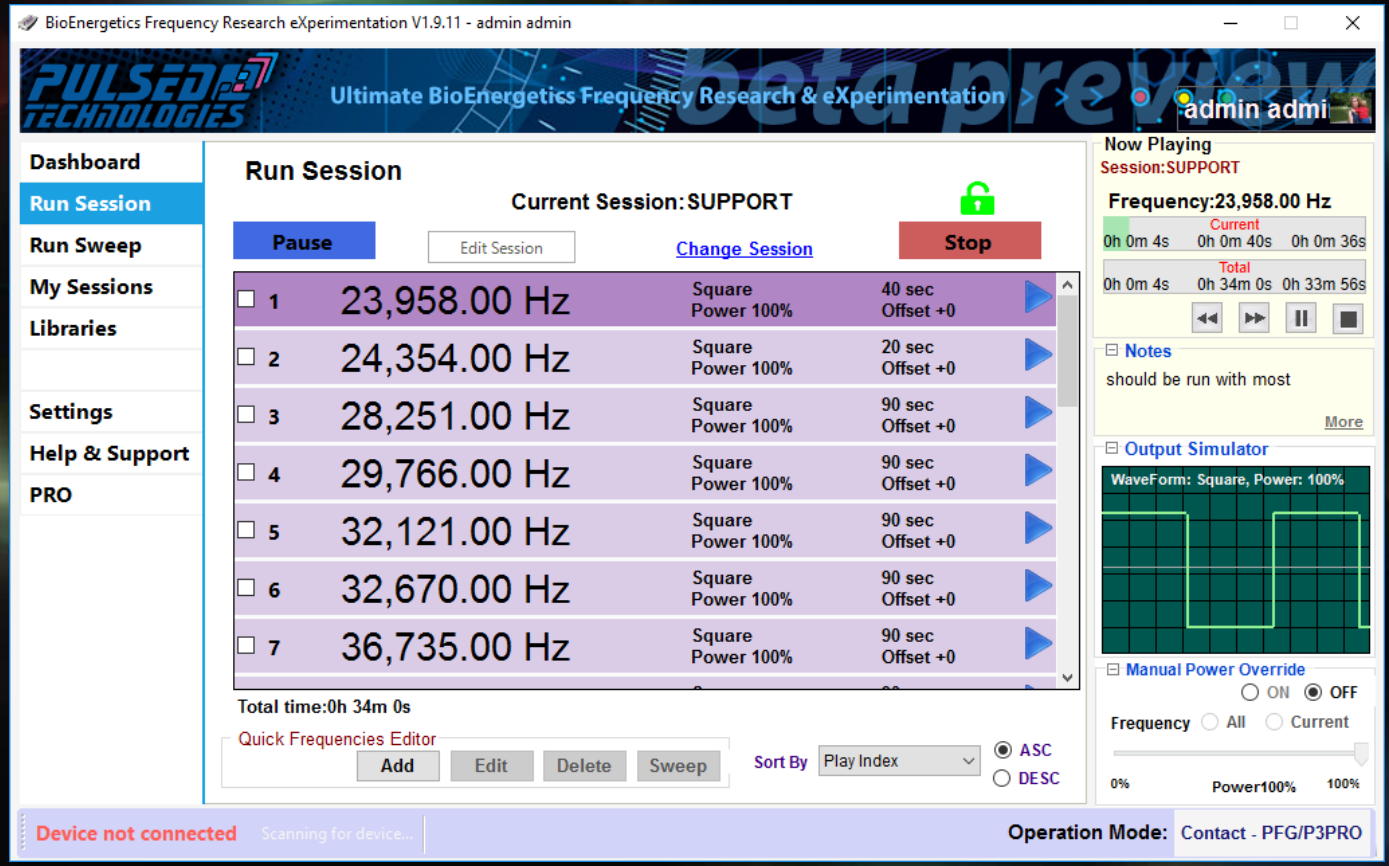
PULSED TECHNOLOGIES
Ultimate BioEnergetics Frequency Research & eXperimentation
Loading components. Please wait.
beta preview

PFG Lab2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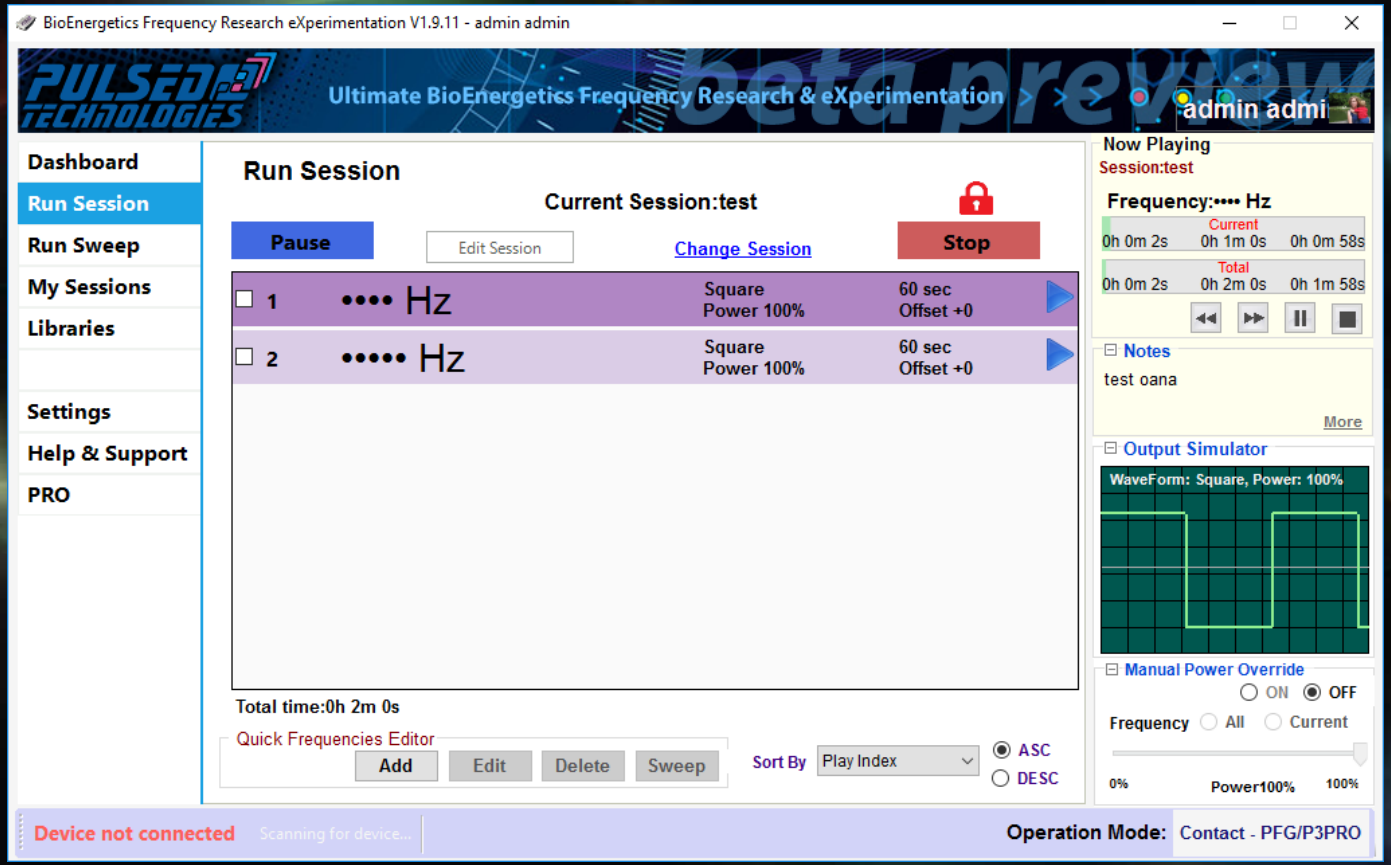
Dashboard
Run Session
Run Sweep
My Sessions
Libraries
Settings
Help & Support
PRO
Run Session
Current Session: SUPPORT
Pause
Edit Session
Change Session
Stop
1 23,958.00 Hz Square Power 100% 40 sec Offset +0
2 24,354.00 Hz Square Power 100% 20 sec Offset +0
3 28,251.00 Hz Square Power 100% 90 sec Offset +0
4 29,766.00 Hz Square Power 100% 90 sec Offset +0
5 32,121.00 Hz Square Power 100% 90 sec Offset +0
6 32,670.00 Hz Square Power 100% 90 sec Offset +0
7 36,735.00 Hz Square Power 100% 90 sec Offset +0
Total time:0h 34m 0s
Quick Frequencies Editor
Add
Edit
Delete
Sweep
Sort By
Play Index
ASC
DESC
Now Playing
Session:SUPPORT
Frequency:23,958.00 Hz
Current
0h 0m 4s
0h 0m 40s
0h 0m 36s
Total
0h 0m 4s
0h 34m 0s
0h 33m 56s
Notes
should be run with most
More
Output Simulator
WaveForm: Square, Power: 100%
Manual Power Override
ON
OFF
Frequency
All
Current
0%
Power100%
100%
Device not connected
Scanning for device...
Operation Mode:
Contact - PFG/P3PRO

PFG Lab2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60 sec
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Square
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60 sec
Offset +0
Total time:0h 2m 0s
Quick Frequencies Editor
Add
Edit
Delete
Sweep
Sort By
Play Index
ASC
DESC
Now Playing
Session:test
Frequency:•••• Hz
Current
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0h 1m 0s
0h 0m 58s
Total
0h 0m 2s
0h 2m 0s
0h 1m 58s
Notes
test oana
More
Output Simulator
WaveForm: Square, Power: 100%
Manual Power Override
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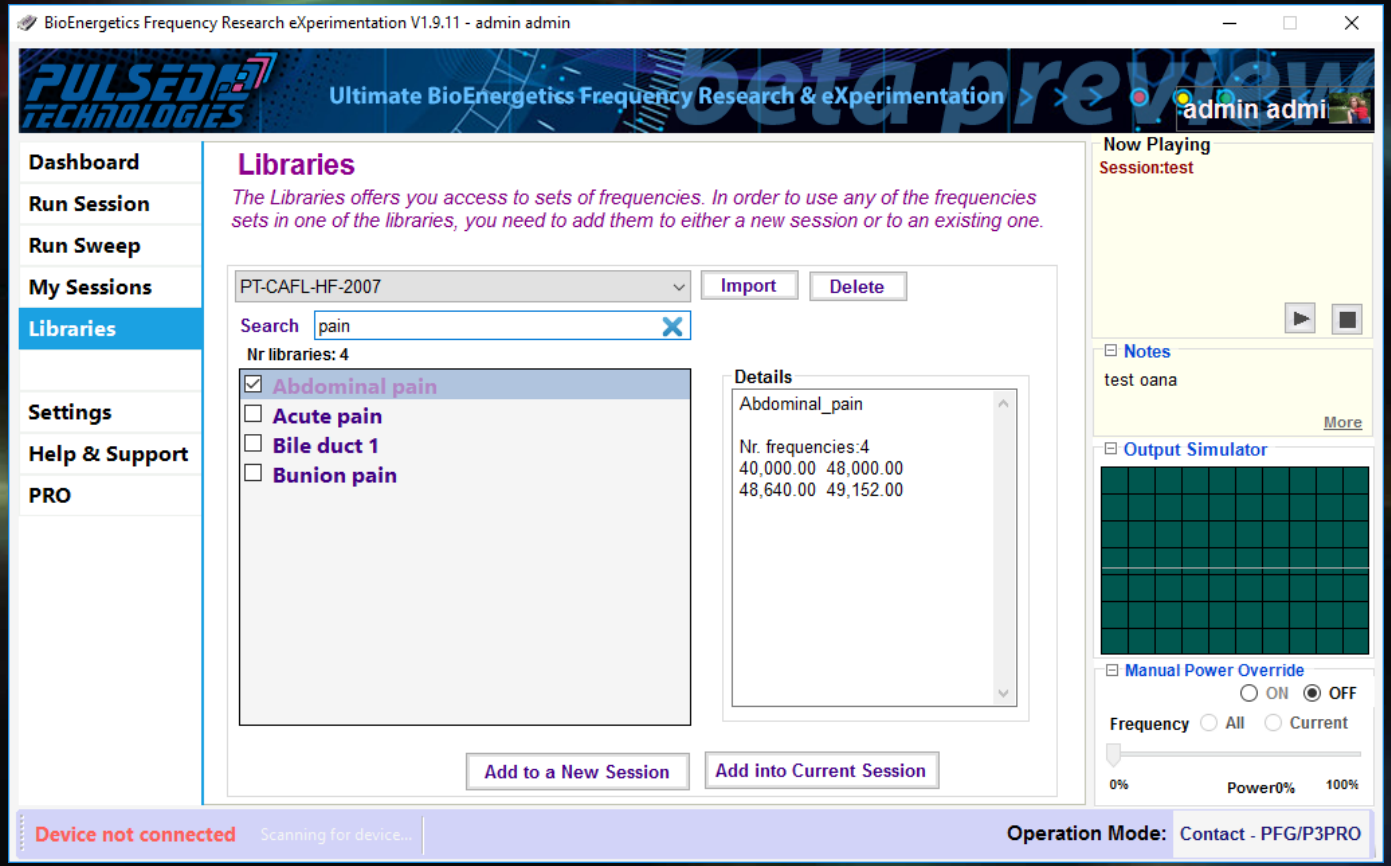
100%
Device not connected
Scanning for device...
Operation Mode:
Contact - PFG/P3PRO

PFG Lab2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beta preview
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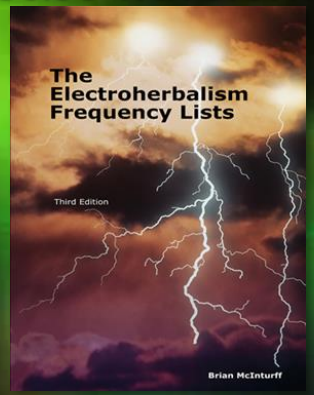
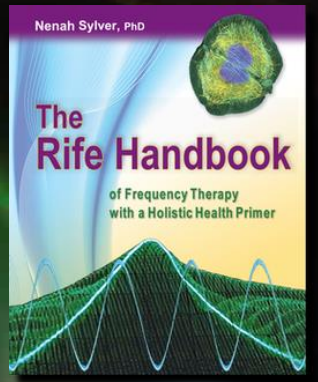
Dashboard
Run Session
Run Sweep
My Sessions
Libraries
Settings
Help & Support
PRO
Libraries
The Libraries offers you access to sets of frequencies. In order to use any of the frequencies sets in one of the libraries, you need to add them to either a new session or to an existing one.
PT-CAFL-HF-2007
Import
Delete
Search
pain
Nr libraries: 4
Abdominal pain
Acute pain
Bile duct 1
Bunion pain
Details
Abdominal_pain
Nr. frequencies:4
40,000.00 48,000.00
48,640.00 49,152.00
Add to a New Session
Add into Current Session
Now Playing
Session:test
Notes
test oana
More
Output Simulator
Manual Power Override
ON
OFF
Frequency
All
Current
0%
Power0%
100%
Device not connected
Scanning for device...
Operation Mode:
Contact - PFG/P3PRO

Q&A – Plasma/Contact Frequencies

- **What frequencies should I be using?**

- You can choose frequencies from the software's library or from other sources. Most frequencies publically available are below 10,000 Hz. However, we recommended running Higher Frequencies. Laboratory evidence CLEARY indicates higher frequencies are more effective. Precise waveform characteristics are also critical. This is also discussed in greater detail in the "Frequency Generation Considerations" document.





Entrainment

- Entrainment is a principle of physics.
- It is defined as the synchronization of two or more rhythmic cycles.
- The principle of entrainment appears in chemistry, neurology, biology, pharmacology, medicine, astronomy and more.

- *Case in point: while working on the design of the pendulum clock in 1656, Dutch scientist Christian Huygens found that if he placed two unsynchronized clocks side by side on a wall, they would slowly synchronize to each other, In fact the synchronization was so precise not even mechanical intervention could calibrate them more accurately.*

Reference: Transparentcorp.com