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INTERACTIONS WITH SCALAR ENERGY-
CELLULAR MECHANISMS OF ACTION

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Recent direct experimental data as well as sophisticated computer-enhanced mathematical analyses of pre-existing data has revealed the predominance of non-linear processes in biological systems(1). These new findings are a dramatic departure from traditional theories which indicate that biochemical reactions are at or near a state of equilibrium and that cells function in a linear, dispersive and degenerative manner. Electrochemical oscillations between membrane-bound lipids near phase-transition temperatures have been reanalyzed with the aid of powerful computers and shown to be most accurately described by nonlinear quantum mechanical equations(2). Similar analyses of coupling between harmonic oscillators represented by action potentials generated from active neuronal networks in the central nervous system has revealed their non-linear nature(3). Several types of quasi-particles, each with their own characteristic resonant frequencies, have been proposed to mediate these non-linear phenomenon, including solitons, excitons and plasmons. Biological solitons have received the most attention and have been postulated to be carriers of biological information along macromolecules like DNA(4) and alpha-helical intramembrane proteins involved with signal transduction mechanisms(5). Furthermore, solitons have been postulated to mediate the coherent electronic excitations associated with the action of ultra-violet and visible light on biological systems(6) and the calcium-dependent cooperative interactions betweeen extracellular glycoproteins on the surface of the plasma membrane in response to weak ELF electromagnetic (EM) radiation(5).

In light of the non-linear nature of biological systems, it seems likely that they should be highly sensitive to non-linear forms of acoustic and electromagnetic radiation in the environment and that the right frequencies of non-linear energies might have profound healing properties. Exogenous non-linear energies were first utilized by Nicholas Tesla in 1899 in his famous Colorado Springs experiments where he demonstrated the transmission of his "Tesla waves" without energy loss(7). These non-Hertzian longitudinal waves have since been studied in hydrodynamics, geology and astrophysics. The extraction of scalar components from Maxwell's original electromagnetic equations(8,9) and from Schrodinger's equations using imaginary numbers(10) has recently been reported. The unusual properties of these non-linear waves have also been described by other investigators(8,11,12). However, relatively little attention has been given to their effects on biological systems. Due to the non-linear nature of biological systems it was proposed that scalar waves should be more biologically active than their linear electromagnetic counterparts(13). A recent report by the author proposed a new theory, the Crystalline Transduction Theory, to explain the mechanism of action of scalar waves with biological systems. It was proposed that scalar energy is transduced into linear electromagnetic energy in the body by liquid crystals in the cell membrane and solid crystals found in the blood and in several biological tissues. Direct effects of scalar energy and coupling

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of scalar energy to conventional electromagnetic fields was also considered(14).

The difficulty of obtainining reliable scalar generators for biological studies has led to a paucity of hard experimental data.However, Dr. Andrea Puharich successfully adapted the "mobius strip" technology for generating scalar waves to a watch. ELF Cocoon Int. has recently modified and impoved Dr. Puharich's original design and now market a readily available, scalar generator, the Tesla watch. Despite the availability of such a scalar generator little is known about the mechanism of action of scalar energy with biological systems.

Numerous anecdotal clinical observations of the healing properties of the Tesla watch have been reported. Since several of these reports include incidences where diminution of the symptomology was correlated with cessation of the scalar emissions from the watch (eg. expired batteries) without the knowledge of the subject, placebo effects are unlikely to explain the clinical results. Nonetheless, it is unknown whether the scalar fields directly effect diseased tissue in the body or whether the clinical effects are mediated through a direct effect of scalar energy on the brain/mind. If the brain/mind is involved it is likely that various psychological states(eg. stress, moods or beliefs) will alter the biological effects of the scalar energy.

CLINICAL STUDIES WITH SCALAR ENERGY

These variables complicate interpretation of clinical experiments with the scalar energy. In additon to conventional confounding variables, one must also consider the EM environment. These factors may explain why some individuals are more sensitive to scalar energy than others, as has been previously observed with EM energy. Even when individuals who are sensitive to scalar energy are predetermined and isolated from the rest of the population under study, they show a highly variable response to treatment. These problems make it difficult to study the healing properties of scalar (or EM) energies in a clinical setting.

EXPERIMENTAL EVIDENCE FOR THE BIOLGICAL EFFECTS OF SCALAR ENERGY

Dr.Eldon Byrd studyed the effects of scalar energy on brain waves by measuring subjects EEG before and after wearing a watch(15). The results indicate an increased amplitude of all EEG frequencies with a preferential effect in the lower ELF frequencies. In addition, an exogenous fregency of 82 Hz was not seen in subjects wearing the watch indicating the scalar wave neutralized this EM signal in the environment, thereby protecting the individual. It is unknown whether this altered brain state is the actual cause of clinical healing which sometimes occurs several months after initial exposure to the scalar waves. It is known that the brain and the body, eg. the immune system, communicate bidirectionally(16). Thus, a direct action of scalar energy on the body could cause a subsequent change in brain states. Therefore these EEG studies do not inidcate whether scalar energy also effects the body directly or whether the brain and the body are both effected.

THE TISSUE CULTURE APPROACH

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The use of cultured cells, separated from the body and therefore isolated (at least to a certain degree) from the influences of the mind offer a unique experimental approach to understanding the mechanism of action of scalar energy in the healing process. This approach could be used to determine direct effect of scalar energy on cells from either the brain or the body. Tissue culture cells are a stable, controlable biological preparation which could also be used to study the biochemical mechanism of action of scalar energy. Even if scalar energy directly effects individual cells, it may also effect the mind resulting in an altered psychological outlook which results in clinical improvement.

Dr. Persinger was the first person to test the effects of scalar energy using isolated cells(17). The scalar waves were generated by partially cancelling two vortex-type magnetic fields(0.5Hz, 10uT) by intersecting them in air. Although a scalar field is likely to be generated in this protocol, it was not measured. The biological endpoint, degranulation of mast cells, was increased by the scalar fields. It is unknown to what extent the EM fields contribute to this result.

Very recently, Dr.Puharich has reported that the scalar energy from the Tesla watch effects the DNA of E.Coli cells grown in tissue culture(18). Working with colleagues at the Max Planck Institute in Germany, they have shown that the RAD-6 gene is activated by scalar energy resulting in increased activity of ubiquitone. Ubiquitone is a protein involved in DNA repair. These results indicate that scalar energy can have a direct effect at the subcellular level as well as a direct effect on the immune system (mast cells).

EFFECT OF SCALAR ENERGY ON NEUROTRANSMITTER FUNCTION

The present study is the first to report a direct effect of scalar energy on nerve cells in tissue culture and indicates that scalar energy can modulate the basic biochemical communication between nerve cells mediated by neurotransmitters. Nerve cells were chosen for this study to determine whether scalar energy can directly effect the nervous system in the absence of any feedback signals from the body. Cultured nerve cells offer a unique model to answer this question. A particular type of nerve cell, called PC12 cells, originally isolated from a rat adrenal phaeochromocytoma, was used because its neurotransmitter properties have been well characterized and shown to be similar to those occuring during normal synaptic transmission in the brain (19,20). Furthermore, the author has previously shown that the functional properties of noradrenaline, an abundent neurotransmitter in these cells is altered by weak EM fields. Noradrenaline release from PC12 cells was shown to be increased by a 500Hz monopolar square wave(21) and noradrenaline uptake was inhibited by a 15 Hz bipolar square wave (22).

Noradrenaline uptake was chosen as the functional neurotransmitter property for this study for several reasons. Neurotransmitter uptake is directly mediated by the plasma membrane via an intramembrane protein carrier. The plasma membrane, with its liquid-crystal strucute, is the critical cellular barrier which interfaces with the chemical and electromagnetic environment. Since other intramembrane proteins show non-linear properties, the plasma membrane appears to be a likely target for scalar energy. Although neurotransmitter release also involves the plasma membrane, it is a much more complicated process which occurs several biochemical steps down the line from the first exposure of the membrane to the EM signal.

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The physiological function of carrier mediated neurotransmitter uptake is to remove excess neurotransmitter from the synaptic cleft after its release from presynaptic nerves. Thus, inhibiting uptake results in the accumulation of the neurotransmitter in the synaptic cleft. This is the mechanism of action of tricyclic antidepressants, since they inhibit noradrenaline uptake. Depression is associated with decreased noradrenalinelevels.

For these studies, the same protocol which was previously used to determine the effects of electromagnetic fields on noradrenaline uptake was used(22). This involved exposing confluent monolayer culture of PC12 cells to radiolabelled noradrenaline in the presence or absence of scalar energy. After a 30 minute exposure period, the cells were washed and centrifuged according to standard biochemical procedures and the amount of noradrenaline that was taken up into the cells was measured using a Beckman scintillation counter. The results were normalized with respect to the total intracellular protein concentration as determined by standard biochemical methods using a spectrophotometer. The final specific activity results are expressed as cpm/mg protein.

The Tesla watch obtained from ELF Cocoon, Intenational was used as a source of scalar energy. According to Dr. Puharich the scalar B field emmitted by the watch is around 8 Hz. The Tesla watch (digital version) was placed directly over an uncovered petri dish containing confluent PC12 cells. At the same time a separate control dish, placed about 12 feet from the experimental dish, was exposed in an identical way to a watch that did not have the scalar generating mobius strip. In this way both control and experimental dishes received the same electromagnetic field exposure, but the experimental dishes were also exposed to a scalar field.

The results are indicated in Table 1. Overall, uptake of noradrenaline into PC12 cells was inhibited by 19.5% in the presence of the Tesla watch as compared with the control value obtained in the absence of a scalar field. Standard t-test statistical analysis revealed a highly significant difference between control and experimental dishes of $p < 0.01$.

Table 1

EFFECT OF SCALAR ENERGY ON NORADRENALINE UPTAKE

TRIAL	CONTROL (cpm/mg protein)		EXPERIMENTAL (cpm/mg protein)	
	10min	30min	10min	30min
1.	1111	4065	1079	3500
2.	880	7032	1137	5009
3.	1076	4520	1110	3592
4.		9033		6035
5.		4277		4041
6.		4117		-
Mean	1022	5507	1109	4435
S.E.M.	+ 72	+841	+ 17	+480

These results allow us to conclude that the scalar energy has a direct effect on nerve cells. The inhibition of uptake is time dependent with no significant effect being observed after a 10 minute exposure. It is

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unknown whether exposure times greater than 30 minutes would produce a larger effect or whether the effect would be maintained either in the continued presence of the scalar field or not. These questions will be examined in additional experiments. Since inhibition of uptake occured after only 30 minutes, it is likely that this effect is an early biological response to scalar energy and may be the trigger for subsequent physiological changes that result in improvement of a wide variety of clinical diseases. Since the scalar energy inhibited the uptake process, it is acting like a traditional antidepressant drug, thereby explaining the antidepressant action of the Tesla watch experienced by some individuals.

These results also indicate that scalar energy, like electromagnetic energy, can have a direct effect on the cell membrane. Since both scalar and electromagnetic energy have the same effect on neurotransmitter uptake, the results offer indirect support for the Crystalline Transduction theory. Thus it is possible that the scalar energy could be converted to electromagnetic energy in the membrane and the latter actually causes the biological effect. However it is also possible that the scalar energy will have a direct effect on the uptake system. Needless to say in the constant presence of electromagnetic fields in biological systems it will be difficult to rule out this possibility. However, certain experimental approaches could be used to determine the mechanism of action of the two types of energies. eg.determine whether alterations in the liquid crystal structure in the membrane would change the effect of the scalar energy on uptake.

In light of the previous discussion, it is also possible that the scalar energy will effect other cells in the body in addition to nerve cells. The tissue culture approach will be an invaluable tool in determining to what extent this is true. This approach could also be used to find out whether diseased cells are preferentially sensitive to scalar energy. The tissue culture approach is thereore a valuable method for studying the biological effects of scalar energy and for ultimately characterizing its mechanism of action.

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