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**The Journal of Alternative and Complementary Medicine:
Research on Paradigm, Practice and Policy**

Title Page

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Key Words:

Bioelectromagnetics, Biophysics, Coherence, Physics of Water.

Title:

Physicks and Physics

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Cyril W. Smith, Ph.D.

'... 'Tis known I ever
Have studied physic, through which secret art,
By turning over authorities, I have
Together with my practice, made familiar
To me and to my aid the blest infusions
That dwell in vegetives, in metals, stones;
And I can speak of the disturbances
That nature works, and of her cures; which doth give me
A more content in course of true delight
Than to be thirsty after tottering honour,
Or tie my treasure up in silken bags
To please the fool and death.'

Pericles, Act iii, Sc.2.
William Shakespeare (1564-1616)

The archaic term Physick or Physic, was in use from the 14th. Century until about 1850 for treating or dosing with medicine, especially a purgative. It had slang connotations, one that persists is the description of a football game as 'physical'. Also about 1850, the distinction began to be made between the physician and the physicist. This paper is concerned with trends that may blur this distinction.

The physician is one skilled in the use of physick or the art of healing, one who makes use of medicines and treatment. The medicines of the physician used to come from the physic-garden, a garden of medicinal plants and herbs. The physicist is a so-called 'student of nature'; students used to take their science degrees in Natural Philosophy, some still do.

I wonder whether hospital physics departments occasionally still get a tap on the door from elderly patients seeking to have their physicks made-up? Wet chemistry has all but disappeared from the hospital laboratory. The Autoanalyser does with one person in attendance the work load of a whole team of wet-chemists. Spectral analysis in the visible, ultraviolet and infrared gives information through the physics of spectroscopy about the bonds in chemical molecular structures and their freedom to oscillate, vibrate or rotate. Clever chemical reactions give rise to quantitative colour or fluorescence changes which are measured with physics apparatus. Chromatography and electrophoresis rely on physical processes and apparatus. The theoretical chemists have taken over the physics of molecules leaving physicists with the nucleus. Yet, with all this permeation of the chemical world by physics, the two disciplines have continued to grow apart, particularly in the education of the physicians.

In the course of a lecture I gave some years ago discussing work from my laboratory (Singh, Smith and Hughes, 1979), I had remarked that Fricke and Morse had published a paper in 1926 (Fricke and Morse, 1926) showing that the

electrical capacitance of breast tissue tumors differed from that of healthy tissue. Afterwards, I was approached by a doctor who had trained in the 1940's. He was appalled to realise that this effect had been known for 20 years before he was in medical school in Germany and that he had to wait nearly 40 years to hear of it, or of the work of Brown, Burr, Ravitz, Chizhevsky, Gurwitsch, Piccardi and many others. I described the historical reasons for this in "Electromagnetic Man" (Smith and Best, 1989). Physics does not enter the physicians realm because of concept and the absence of a theoretical basis in physics for biology.

Chemistry was readily comprehended in terms of models with balls-on-sticks. The duality between electromagnetic frequency and the chemical bond which makes spectroscopic analysis a possibility is lost in this model. Furthermore, the concepts of physics were those of so-called "classical physics", heat, light sound and mechanics. This cannot account for any chemical change brought about by a physical force. Chemistry like spectroscopy is based in "quantum physics". Therefore, if there are chemical changes brought about in living systems by physical forces or fields or, physical changes resulting from chemical reactions, these must lie within "quantum physics".

In 1988, Professor Herbert Fröhlich (Fröhlich, 1988) wrote that any future "theory of biology" will make use of coherent excitations in active biological systems. It was in 1938, that he first learned of the enormous electric field in biological membranes and realised that these would resonate at millimetre wavelengths, frequencies not then available for experimentation. Later, he was able to consider theoretically the consequences of the excitation of coherent oscillations in this frequency region resulting in a possible explanation for the particular order present in space and time in active biological systems, their morphology, and thus linking macro- and micro- physics through space-time coherence,

The living system is a very closely regulated chemical plant. One must ask from where does this regulation originate and how does it operate? Remember that a chemical change may commence with an idea in the mind and be directed to implement muscle activity to reach out and grasp, with obvious intent, and from a very early age of infancy. I have presented the case for regarding a living system as a macroscopic quantum system (Smith, 1998a). This is where the *'paradigm, research and practice'* advocated by this Journal must meet.

In the early days of television, a graffiti appeared in Oxford University which read, "Please do not adjust your mind, there is a fault in reality". The present reality is that we are looking at the living system with one eye shut, the eye of quantum physics. The "Uncertainty Principle" of physics may well apply to a living system in which all the details of the energetics and chemical arrangements of molecules can be determined with greater and greater accuracy but, the instants at which these changes take place will become proportionately less and less well defined.

There is now a theoretical basis for involving quantum physics in something as basic to life as water. Water molecules have long been considered to interact over distances long compared to atomic dimensions to produce those rather

mystical hydrogen-bonded evanescent structures postulated for water memory and vicinal biological cell water. In Italy, two theoretical physicists (Del Giudice and Preparata, 1998) applied quantum theory to the electromagnetic radiation associated with the molecular spectra of water. They found that the frequencies of individual water molecules could become highly coherent with domains of about 75 nm in size within which all the water molecules oscillated coherently, in-phase, with an enormous electromagnetic field. Outside a domain, the water molecules behaved in a random, vapour-like manner. Interactions between these domains of coherence explained how water vapour could condense to liquid water and calculations gave the correct value for the latent heat of vaporization. This model could also account for other anomalies in the physical properties of water and explain how water might have a memory. A topic which the present writer has discussed in respect of homoeopathy (Smith, 1998b) and electromagnetic hypersensitivity which occurs primarily in patients with existing chemical sensitivities (Smith, 1998c).

The meridians of acupuncture may have their origin in coherence (Smith, 1990). In the presomite stage of the embryo, the ectoderm and endoderm cell layers are in close contact. If they synchronise their oscillations to become coherent and if, as the organism develops, this coherence is maintained there will be lines of coherent oscillations stretching from the epidermis and ear of the ectoderm to the target organs of the endoderm and mesoderm.

The writer has long been advocating the use of the vector potential from toroidal coil in biological experiments as a way of providing comparison with the magnetic fields generated by the usual coils to determine whether a given biological system is operating in classical or quantum physics. One such set of experiments by Dr. Mae-Wan Ho (Ho et al., 1994) and her co-workers involving weak external magnetic field induced abnormalities in pattern formation in *Drosophila* embryos led them to remark that,

“...The results with the toroidal coil are quite tantalizing. Despite the fact that the magnetic field is negligible, significant increases in abnormalities are found over matched controls, and both when the embryos are in place before or after the power supply is switched on....Our results suggest that indeed, the embryos may be sensitive to the vector potential in an essentially field-free region....”

Coherence in biological systems extends from millihertz through to the optical end of the spectrum and because coherence length becomes the constant parameter, many frequencies and velocities of propagation can be present simultaneously. Biophotons, their coherence and endogenous nature has been a research activity of Dr. Fritz Popp (Popp, 1998) since 1972. He has reached the conclusion that,

“...biological regulation can be understood in terms of biophoton emission and that ordinary biochemistry cannot give a completely satisfactory answer to all these basic questions.”

These are but a few areas where the concepts of coherence applied to living

systems may eventually lead to a theory of biology based upon established concepts in quantum physics. Alternative and Complementary Medicine will then be seen to be nothing more than opening the blind eye to reality.

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