

Reflections on the Shang Growth Control Model of Acupuncture Action

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Since reading Charles Shang MD's review paper on the Growth Control Model (GCM) for acupuncture (<http://ecam.oxfordjournals.org/cgi/content/full/nem122v1>), I've found his model keeps coming to mind and I'll here briefly discuss ways in which it has shed new light on three areas of long-standing interest to me. I encourage everyone interested in electro-biology, subtle energy, and energy healing to read Dr. Shang's seminal work—it is relatively short and easy to understand.

Sinoatrial node as possible Master Growth Control Center

Spiritual Master Adi Da Samraj discussed the sinoatrial node (SAN) of the heart—aka “the pacemaker”—as “the bodily seat of consciousness” in his 1978 classic **Enlightenment of the Whole Body** (he was “Bubba Free John” at the time). As both a student of his Way of the Heart and a physician in the decades that followed, I thus found myself more and more focused on cardiology (and not *just* because heart disease is the number one killer in the developed world).

In the late '90s I did some library and internet research on the SAN and discovered that

- it seems to play a central role in embryogenesis as the first organ to begin functioning—at around day 21.
- it seems to be the focal point around which the heart forms at the *head* end of the trilaminar embryo *before* it begins to fold and twist into the chest. It is thus located at a leading point of "curvature" (and torque) in the developing body plan.
- It contains some of the most conserved genes in the animal kingdom—meaning that a number of the genes uniquely expressed in my SAN are also found in the most ancient of animals.
- In adults it consists of a thumb-nail sized disc of approximately 150,000 specialized muscle cells that function electrically as a whole by virtue of the many electrically conductive *gap junctions* between them.
- The beat of that heart it triggers is by far the most powerful electrical signal in the body and throughout life.

Reading Dr. Shang's review was eye-opening since it appears that many features reminiscent of the SAN are found in growth control center tissues associated with acupuncture points. His model proposes that stimulation of an acupuncture point, by any of various means, has first an immediate *electrical* effect that can propagate through the body—perhaps preferentially along the meridians. The meridians connect acupuncture points in a distinctive pattern that appears to reflect the developmental geometry of the tissues involved. From the meridians, low-level electrical signals may also propagate more generally to other parts of the body as well. Then, in response to this electrical stimulation, cells of the growth control centers appear to turn on the

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production of soluble growth factors. There are various mechanisms by which this switch could operate. One may be via “epigenetic” effects—i.e., via a direct effect of electrical stimulation on genetic expression (see, as just one example of many that could be cited, a recent report from Harvard (http://focus.hms.harvard.edu/2007/030907/regenerative_biology.shtml) that suggests such a possible connection). These secondary effects can be long-lasting and may likely help account for the often lasting therapeutic benefits of acupuncture treatments.

In a brief email dialog about this possible connection with the SAN, Dr. Shang wrote “heart has a more important role in traditional acupuncture and traditional Chinese Medicine (TCM) than that in modern biomedical science. TCM and qigong seem to suggest that heart may have some mental and regenerative functions.” This view is certainly consistent with the yogic tradition in particular, and perhaps the greater range of spiritual traditions in general as well. This is a fascinating topic to pursue—especially for me as I develop the “Yoga Science Cardiology” (to be first presented next month at ISSSEEM during the “research day” on Friday).

How could it be that TFT and EFT seem to work so well?

Thought Field Therapy has been developed by psychologist Roger Callahan PhD and his wife Joanne over the past 20 years. Gary Craig, a Stanford engineering graduate and an ordained minister, learned TFT from Callahan and added in some of his prior training in Neuro-Linguistic Programming to create Emotional Freedom Technique—EFT. Both TFT and EFT invoke acupuncture points as the sites where gentle finger tapping is done on specific locations on the body, typically in association with a process of bringing to mind an emotionally charged memory. Extensive clinical experience on the part of hundreds of practitioners trained in these techniques, lay and professional, has led to great enthusiasm in the field of energy healing. How could such a simple thing as tapping fingers on acupuncture points have such dramatic effects?

Clinical trials of TFT appear to be limited to a single pilot study with wait list control done in 2003 at the Sorlandet Hospital in Kristiansand, Norway by Audun Irgens et al. 48 psychiatric out-patients with various diagnoses were offered a total of 1½ hour of TFT sessions over a several week period. Symptom were assessed both by self-rating and interview scales. Although the findings were apparently not considered worthy of publication in a number of international journals for a variety reasons, they suggest strongly that even these brief TFT interventions had robust effects. Dr. Irgens is apparently currently extending the study (Joanne Callahan, personal communication, 5/24/05). Meanwhile, published clinical trials of EFT have been thus far limited to small but very promising studies. An extensive overview of these is available on-line at http://www.eft-tom.com/eft_emotional_freedom_technique_eft_research.html. A more formal pilot study (<http://clinicaltrials.gov/ct2/show/NCT00668993>) is currently being organized by Peta Stapleton MD in Australia (<http://www.griffith.edu.au/professional-page/dr-peta-stapleton>).

However, even if the current enthusiasm for these techniques is backed by clinical research findings in the future, the question of mechanism will remain. Here again, Dr. Shang’s GCM comes to mind. To begin with, he lists “non-specific activation of acupuncture points” as one of the key “puzzling facts” accounted for by the GCM. There is research supporting the notion that all living tissue is piezoelectric (<http://www.ortho.lsuhs.edu/Faculty/Marino/Papers/108Piezoelectricity.pdf>). This means that

even gentle finger tapping of acupuncture points will likely generate small voltages and currents. To be further established is that these are of a magnitude sufficient to activate acupuncture points. However, that cells are sensitive to extremely weak electrical signals is well-established in electro-biology and that even extremely weak signals can have robust clinical effects has been extensively documented in the published work by Reuven Sandyk MD (<http://www.earthpulse.net/Sandyk.htm>). Might the frequency of the tapping play an important role here? I'll touch on that issue in the following section.

If finger tapping does indeed activate acupuncture points as claimed, then the GCM suggests how lasting effects might occur. The hypothesis put forward in the extensive overview cited above involves more conventional CNS-mediated interactions, but of course it is conceivable that *both* are playing important roles: CNS mechanisms likely play a key role in the recollection of emotionally-charged memories, whereas the set of mechanisms invoked by the GCM may be the key to how the tapping can interrupt and alter the circuits that maintain and express the painful emotional memory.

How could the miniscule signals of the LENS neurofeedback method possibly have the dramatic effects observed clinically?

My wife Susan Pottish was a clinical biofeedback therapist for a number of years in the late 1990s. She worked extensively with early versions of the LENS system developed by psychologist Len Ochs, PhD (<http://www.ochslabs.com/>). Perhaps the most striking thing she encountered working with this system was how extraordinarily sensitive some of her clients seemed to be to the stimulation signals generated by the system. She and I spent many hours discussing *how* this might be happening. The LENS system works with brain-wave frequencies, most typically in the range between delta and beta (2 – 30Hz). Using a single scalp electrode, placed according to clinical decision based on an initial multiple placement screening map, the system detects a “dominant frequency.” Ochs had previously established that in a wide variety of his clients, a typical symptom cluster associated with closed head injury (and many other forms of trauma) was associated with a strong and persistent dominant frequency. He proposed that the brain had become “stuck” at this frequency as a result of the trauma, that the symptom cluster was associated with this “stuckness,” and that if the brain could be coaxed out of that “rut,” it might recover some of its previous functional flexibility. He designed the system to generate a stimulation signal frequency shifted a few hertz (up or down depending on protocol) so as to entrain the brain out of its “rut.” As dramatic clinical results accumulated, more clinicians were trained in its use and the approach became more widely applied. It remains today considered a form of “neurofeedback” even though it departs from conventional forms of biofeedback by not involving the client in a “learning paradigm” of any sort—the machine does it all. (Interested readers will find that two books have been published on the LENS approach: **The Healing Power of Neurofeedback: the Revolutionary LENS Technique for Restoring Optimal Brain Function**, 2006 by Larson & Hartmann and **Len: the Low Energy Neurofeedback System**, 2007 by Hammond. A general introduction to neurofeedback is presented by Demos & Demos in their 2004 **Getting Started with Neurofeedback**.)

Is it possible that the LENS system is interacting with the meridian system proposed by the GCM to connect acupuncture points? Is it possible that this system is itself sensitive to the very low

level signals produced by the LENS system. Might the low frequencies involved be coupling to specific frequency-dependent systems associated with the meridian system? Might these same low frequencies also be involved in the tapping intervention associated with TFT and EFT? I hope we'll explore these possibilities further as we go forward.