

Subtle Energies & Biophysics  
Beverly Rubik

Extracted from: <http://www.esalenctr.org/display/confpage.cfm?confid=2&pageid=8&pgtype=1>  
Esalen Center for Theory & Research: <http://www.esalenctr.org/index.cfm>

Summary of presentation at Subtle Energies and the Uncharted Realms of Mind: An Esalen Invitational Conference 1999 June 6-11

Beverly Rubik's interest in biophysics reflects her thirst for a life science big enough to accommodate the full human potential; our conventional life sciences deal mainly with the mechanical aspects of life rather than its most creative potential. She is disturbed by the overwhelming move towards molecular biology, a shrinking of the horizons of the discipline. In terms of our conference interests, she studies biophoton emission (low-level light emitted from organisms), the application of light as a healing modality, and energy medicine in general. She feels that studies of local healing effects with healers are richer and more interesting than distant ones, for they more closely mimic actual healing practices. Her interest is to study subtle energy processes and not just nonlocal transfer of information, as seems to be operative in most varieties of psi and distant healing.

Twenty years ago, when she first began her work, virtually no one except Bernard Grad[1] (*Grad et al, 1961; Grad, 1963; Grad, 1964; Grad, 1967*) was doing research on healers, at least partially because it was rather audacious to even label oneself as a healer. She herself experienced a healing with a healer. Instead of going for a highly recommended surgery on her knees, she visited a healer instead. The healer entered a trance-like state and Beverly felt a strange tingling in her knees that led the pain to vanish. It never returned and she never went for surgery. This convinced her that there must be at least something to the claims of healers.

Because she was doing her dissertation at the time on bacterial chemotaxis, she thought to have the healer woman attempt to affect the bacteria. She found effects on both bacterial growth and motility. The healer refused to intentionally damage the bacteria, for such action went against her philosophy of healing; every creature has the right, in her opinion, to live outside the body. At the time, Beverly was using a weak pathogen (*salmonella typhamorium*) which causes typhoid fever in mice and dysentery in humans. The healer would not treat using a dose-response schedule (1 minute, 2 minutes, ten minutes and so on) because this also conflicted with her worldview. She felt that if she treated for longer than the number of minutes she would normally treat, she would damage the bacteria and she was unwilling to do that. All of this made doing a study difficult, but Beverly said such hurdles are common when working with healers. The healer ended up treating for about 2.5 minutes each, placing her hands a few inches from the test tubes. The results: no effect on normal bacteria, but when Beverly damaged bacteria with antibiotics (tetracycline, chloramphenicol, erythromycin, chlorophene) that crippled the cells in various ways, the healer was able to accelerate their growth by between 2-30%. It did not seem to be chemical specific. Beverly had been working with the cytotoxins extensively for her dissertation, so she knew the exact dosages needed to knock out bacterial populations entirely. When she did completely knock out the cultures, the healer could not revive them. The healer often described metaphorically the way in which the bacteria were damaged ("These are being starved") despite double-blind controls and the impossibility of seeing anything with the naked eye.

Additional points: Beverly never found any enhancement at the level of mutation (as she hypothesized

might be possible) and never found any extra growth in the starving bacteria test condition. The motility-inhibitor proved to be another successful run, partially because it gave the healer immediate feedback. The large dose (.1 Molar solution) of the drug immobilized the bacteria and under normal conditions they could not metabolize it in a ten or fifteen minute experiment. Beverly would show them to the healer under the microscope, telling her that they were paralyzed. After a ten-minute healing treatment, Beverly found as many as 7% of them swimming again. She had never seen this, though she often used that protocol as a way to paralyze and thereby count bacteria at the end of a trial. The healer had a belief she could intervene and that her power came from God; she had an avid interest in saving the bacteria's lives. She even got angry when, at the end of the experiment, Beverly destroyed the bacteria she just worked to save. This taught Beverly to honor the belief system of such healers.

One advantage of working with cell systems is that, presuming they are not conscious entities in the same sense as humans, the researcher need not worry about the belief and expectations of the subject. Nonetheless, there are still experimenter effects; a die-hard skeptic once visited her lab and he seemed to visibly and invisibly irritate the experiments, spoiling research results. Cells, like REGs, behave according to distribution curves; there's a lot of heterogeneity. Even a clone of a single bacterium can show significant deviations in movement, size, etc.

Beverly then reflected on the huge problem of boredom when designing studies. People are looking for novelty and healers want to actually heal. Repeated runs instill boredom. She told the story of a psychic healer who was quite good, a man named Terry Ross, who could not relate to the Schmidt random generator she was using. She finally urged him to imagine it as a baby or a puppy dog. He cradled the machine tenderly, and when he pushed the button, he got a very high score. However, this singular moment when his relationship with the box shifted cannot be replicated. Psychic events often happen with incredible meaning and purpose; after the hundredth trial of a study, there is no meaning or purpose left. She thus wonders whether it is a bit artificial to demand statistical significance when thinking about life. The method of science is not well designed to address questions of extraordinary human performance. A dilemma: science demands repetition, but that very demand squashes the effect.

Marilyn commented, though, that her research shows that psi-conducive researchers see importance in each run, which helps maintain their engagement. How we story the experiment thus makes a difference in maintaining motivation. Dean Radin commented that he has worked a bit with healers; one worked well with a Geiger counter because he felt it was good to suppress radiation. Some of their quirks can thus become an asset. Bernard Grad concurred that there is a necessary artistry and tact in honoring the needs and beliefs of healers. With Estebany, one of his stars, they would only get significant effects when he enjoyed the work that he was doing. As soon as he got annoyed or bored, the effects dissipated.

Since Beverly's work focuses on local healing effects, she must pay attention to multiple variables and possibilities, from body fields to intentionality. Biological systems are not simple. They often work with parallel systems. Also, living systems are capable of responding to extraordinarily small effects from fields, effects that should be below the level of thermal background radiation. To understand this, we must think in terms of chaos theory in which small effects can shift a system into another attractor basin. George Leonard added that Jan Wallenczek at Stanford has shown that some frequencies below KT (thermal limit) will cause calcium uptake in cells to be reduced while others will lead to increased calcium uptake. Classical physicists take it as an article of faith that this is not possible. Beverly agreed that this has been shown in many labs but is still dismissed within mainstream science.

Marilyn reminded us that some people are better able to function in a laboratory setting than others and this might not reflect their ability in general. George seconded that there is a democratization of the extraordinary underway. We all have these latent abilities, given the right instructions and practice. For example, in his Integral Transformative Practice study, one person did visualization exercises for two years focused on her growing cataracts and successfully cleared them, which is thought to be a medical impossibility. Patient, diligent practice is the key. He cited an article in *American Psychologist*[2] which surveyed dozens of studies undermining myths around special talents and abilities. Yes, talent is important, but practice, they conclude, is far more important. The authors took kids and trained them to have perfect pitch, which is typically seen as an innate talent. They showed that this is not the case. Beverly agreed with his point about healing, especially since there are now several schools of healing, from Therapeutic Touch to the Barbara Brennan school. These trained healers are especially good at alleviating pain. Dean Radin countered that there is a distribution of talents and abilities. People with significant talent who practice a lot will be much better than someone with medium-range talent who practices a lot; this is true whether we are talking about calculus, playing the cello, or healing. Roger emphasized that there are several skills to practice: one is a talent or a skill, while the other is something like acceptance or surrender into a different domain (effortless effort).

Russell Targ questioned Beverly about systematic studies contrasting distant healing with proximal healing to see if there is any real difference. Anecdotally, a healer named Bob Skutch who does hands-on work, as well as distant healing, claimed that distant healing is equally efficacious. Beverly said no studies, to her knowledge, have been done; it is even difficult to distinguish what is local and distant healing in the literature because it is not reported as such. We can't go back and do meta-analyses.

Beverly then discussed an unpublished study she did with a healer named Hostad Hadid Habaranda who was passing through Pennsylvania and Hostad was eager to train Western doctors in his methods. He came with an impressive medical database of cases he had treated. He had once treated an inoperable spinal tumor which went into remission, sparking the grateful patient to pay for his travel to the West. Beverly was working with a naturopath and they had an electrodermal testing apparatus designed to measure the conductivity of acupuncture meridians (whether they are sending or receiving energy or are blocked). When Hostad worked on twelve patients, there was a strong movement towards normalization in the patient's meridians. She hypothesized that there was a resonance or entrainment -- a movement towards the healer's energy -- just at the moment of healing. She wants to follow up on this, especially since the meridian system is a possible model of the human biofield. An explanatory framework like the meridians, although perhaps not identical, is necessary to explain how energy medicine works. Another interesting study by David Muesam with chi gung masters showed they could interact with a biochemical system that was sensitive to externally applied electronic fields (in this case, the phosphorylation of myosin). The chi gung masters delivered chi into the system and researchers found that they could slow the reaction rate in a way similar to externally applied electrical fields. This doesn't mean that chi is electromagnetic but it does imply that it is an energy.

Beverly noted how tricky it is to measure or define chi, for it appears to be ultraphysical, part of another dimension in some ways, and yet it is physical. There are also local and non-local aspects to it. Beverly had long hoped for a chi-meter and woke up one morning with a numb thumb. The thumb gradually regained sensation, and as it did, she could feel chi during classes she was teaching. This effect persisted for about three to four months, and she can still feel it occasionally. Chi might, she feels, only be a property of living things and therefore difficult to register with machines. Bernard Grad's solution has been to use plants as a form of chi-meter, since they respond with different growth

rates. George Leonard commented that Fred Lorenz wired him once and he was able to move chi from side to side and measure it with electrical conductivity.

Beverly's work with healing and bacteria is consistent with an energy factor, that a healing transmission might increase ATP uptake and/or production in the cells which would allow them to overcome the antibiotic or motility inhibitor. Is there some change in the bioenergy field of those who are doing so with a strong healing intent? If there is an energy involved, it must presumably be coming from the body. Her question, then, is how intention and the biofield are working together. It is a crucial one, for this mirrors the therapeutic partnership in medicine. There is growing recognition of the power of touch, hugging, massage, and now there are many energy healers. As the practical applications move forward, we need good research and theory to model the forces at work.

She believes that we are radiators and antennae for biofields, even if these biofields are relatively small in relation to the sea of energy in which we swim. The hands appear to be special instruments for sending and receiving. Dean Radin commented that technology is making great strides to image this kind of stuff from a distance (infrared video analysis, for example, has gotten great material when filming chi gung masters, who appear to have interesting patterns around the belly when entering their practice). Charles Overby is also working with a CCD camera to examine ultraviolet sensitivities and try to get pictures of the human biofield aura.

Biophotons is another area in which Beverly has serious interest. Is the low-level emittance from organisms just junk light? She believes it might reflect cells signaling to nearby cells somehow. Kasachayof had an experiment with a virally-infected eukaryotic cell culture, placed in a Cords petri dish that allowed ultraviolet light to pass through as well as visible light. A nearby culture in another Cords dish was identical except it was not infected with the virus. When the virus did its job and killed the first culture, those cells emitted some light, which was perceived (apparently) by the other culture dish. The bacteria in the not-infected culture acted as if they had been exposed to the virus, and began to weaken and to die. Control cultures in regular petri dishes and pyrex dishes were not similarly affected. He interpreted this as cytotoxic light -- a kind of cellular death ray -- transferring from one culture to the other. Milton Wainwright, from the University of Sheffield, England, replicated this two out of three times. He had no idea why it didn't work the final time.

Beverly thinks that this light emission might be a mediating factor in healing effects, such as with the laying on of hands. However, measures of photon emissions from the hands do not seem to correlate with healing effects in the lab, so it is hard to say whether such light is informational. Beverly did an experiment in Germany a number of years ago with a sea algae Gannulox. They used an irritating chemical that caused it to emit light. They had sea algae in two chambers (same age, same sample) joined by an optical window. When the window was open and one of the algae cultures was irritated with the chemical, the other would also go into a sympathetic light emission, as if it were responding to the distress/emission of the other. When the window was closed, however, no such sympathetic emission took place. What it means, nobody knows. The color of biophoton emission is very broad-band, so it is hard to say what information this might be carrying.

She also feels that we need a new term to discuss this subject: energy is too vague and loaded. We can borrow terms like ki, chi, or prana but they don't translate across cultures very well. She has tried to use "biofield," but no one uses it in common parlance. Roger feels that the language difficulty compounds the problem of trying to get funding, for there is the inevitable confusion with standard and accepted

physical energies.

Beverly's research priorities: 1) get a dark-field microscope and video set-up. There are much better systems now than when she first began her work. An electro-dermal testing operation would be useful as well 2) study white blood cells 3) focus on things that impact on health and healing, the practical ramifications. Wayne Jonas mentioned that the new NCCAM has to give 2% of its money for small business grants; it just has to relate to alternative medicine.

### References

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Electromagnetic and Other Subtle Energies in Psi Research  
Beverly Rubik, Ph.D.

Extracted from: <http://www.esalenctr.org/display/confpage.cfm?confid=8&pageid=69&pgtype=1>  
Esalen Center for Theory & Research: <http://www.esalenctr.org/index.cfm>

Summary of presentation at Subtle Energies and Uncharted Realms of the Mind: An Esalen Invitational Conference, 2000 July 2-7

Beverly Rubik opened the formal presentations with some interesting theories and data that, when taken together, pave the way to a possible relationship between subtle energies and psi. From the start, Rubik pointed out that psi research is still unconsciously rooted in the paradigm of physics. In other words, when trying to explain psi phenomenon, theorists automatically turn to quantum theory without considering the fact that psi is mediated through embodied, biological organisms, namely humans, plants, and animals. Thus, Rubik challenged the psi field to move beyond the old paradigm, in which physics predominates, towards a "life-source" paradigm, in which the life sciences are central. In this new paradigm, researchers would start with the assumption that things are alive with sentience and bio-information, as opposed to the old paradigm, in which researchers unconsciously assume a life-less and mechanical context in which humans are the only living beings. Furthermore, Rubik also pointed out another unconscious tendency in psi research, which is to seek out a singular explanation for its behavior. In contrast, Rubik offered that there may be multiple mediating forces at work in psi phenomena, and our challenge is to be open to them all rather than always try to explain things via physics, and quantum theories of non-locality in particular.

### **Does "Energy" Mediate Psi?**

At the beginning of her presentation, Rubik addressed this enigmatic issue. Most psi phenomena betray the normal laws of physics. For example, psi seems to be independent of space and time in that repeated experiments have shown that distance does not reduce the effects of psi, nor can psi be shielded by a Faraday cage. This has lead theorists to turn immediately to quantum concepts (particularly John Bell's theorem of non-locality) to explain psi. Rubik, however, asked the conference participants to entertain the idea that psi may be mediated by an energy that is so low in frequency that is not detectable by our current instrumentation. Unfortunately, the use of the word "energy" is very problematic because it has so many associations. Thus, Rubik and a number of the participants discussed the need for a new word that would match the new paradigm that Rubik and others are trying to foster.

### **Bioelectromagnetics**

Coming from her background in biophysics, Rubik discussed the emerging field of bioelectromagnetics, which looks at the electromagnetic field that surrounds living organisms. To demonstrate the power of a even just a slight increase in strength in this field, Rubik pointed out that a salamander can regenerate a full leg after it has been amputated, while a frog cannot. This is due to the fact that the salamander has a slight difference in the milivolts of power of its electromagnetic field.

Turning to humans, Rubik discussed how SQUID machines use liquid helium to measure our various magnetic fields. Interestingly, the human heart emits the largest electromagnetic field, while the second

largest is produced when we open our eyes in the morning (called an occulargram). Surprisingly, our brain waves are low on the list, even below the field generated by our muscle activity.

Rubik also discussed the Schumann resonance pattern, which is a natural resonant frequency that circles the earth and is produced by the resonant cavity between the earth and the ionosphere and all the lightning storms that bounce off the earth. The normal resonance is 7-8 hertz, but it is disrupted during geomagnetic storms and disruptive solar activity. All the wave lengths are in the ELF range. Rubik emphasized that the Schumann resonance is a virtually identical frequency to the human brain alpha emission, which is associated with relaxation. Barbara Brennen noted her experience that healers having a good day are in resonance with the Schumann frequency. Rubik added that Scott Hill wrote a book called *Cycles of Heaven* in which he looked at how the changes in Schumann resonance change human behavior. Most research on this topic is happening in Eastern Europe and Russia.

Turning from the earth to the universe, Rubik also asked us to consider cosmic hypotheses for psi effects. When looking closely at what time is most conducive for psi effects, the parapsychologist, Ed May, found that 13.5 hours sidereal time is the most optimal moment. One theory to explain this proposes that when the Milky Way galaxy is on the horizon instead of directly overhead, our earth is more exposed to empty space. Dean Radin added that we may need to consider how our relationship to the Milky Way influences the amount of radiation impinging upon the earth. Rubik noted briefly that Gaussian distributions for random processes (such as nuclear decay) are not so random after all, because they seem to correlate and coincide with certain cosmic cycles.

In conclusion, Rubik stated that we are creatures of our solar system, and as such, it is possible that our energies, our consciousness, and even our psi abilities are linked to the larger cosmic picture.

### **Geomagnetic and Geocosmic hypotheses**

Rubik emphasized the importance of including the magnetic field of the earth itself into the larger pool of theories of how psi is mediated. She noted that every 11 years there is aberrant geomagnetic activity that correlates with the sun spot cycle.

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