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RESEARCH

Anomalous Magnetic Field Activity During a Bioenergy Healing Experiment

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Abstract—A few studies have reported magnetic field changes during bioenergy healing. In a pilot experiment, we examined magnetic field activity during hands-on healing and distant healing of mice with experimentally induced tumors. During healing sessions, we observed distinct magnetic field oscillations adjacent to the mice cages, which were similar in appearance to those reported by Zimmerman (1985). The magnetic field oscillations began as 20–30 Hz oscillations, slowing to 8–9 Hz, and then to less than 1 Hz, at which point the oscillations reversed and increased in frequency, with an overall symmetrical appearance resembling a "chirp wave." The waves ranged from 1–8 milliGauss peak-to-peak in strength and 60–120 sec in duration. Evidence to date suggests that bioenergy healing may be detectable with DC gaussmeters, although we have not ruled out an artifactual basis for the oscillations reported here.

Keywords: biofield—nonlocal effects—distant healing—ELF magnetic field

Introduction

Bioenergy healing therapies, such as Healing Touch, Therapeutic Touch, Reiki, and external Qigong, have demonstrated clinical effects (Benor, 2001, Chen, 2004, Engebretson & Wardell, 2007), but the scientific mechanism and energies underlying these therapies are not currently understood. Investigators have tried to measure putative energies emitted by healers using a variety of instruments and methods, including magnetometers, voltmeters, photometers, gamma radiation counters, sound equipment, and gas discharge visualization (Oschman, 2000). Of these methods, magnetic field measurements may be the

most promising. Seto, Kusaka, Nakazato, Huang, Sato, and colleagues (1992) studied the magnetic field strength adjacent to the palms of 37 Qigong healers' hands during "external qi" emission. In 3 out of 37 cases, they observed a 4–10 Hz oscillation in the magnetic field, with peak-to-peak magnetic field strength of 2 to 4 milliGauss. Normally, the human body radiates magnetic fields of less than 10^{-6} gauss (Cohen, 1967), so this was an increase in magnetic field strength a thousand-fold greater than normal.

In agreement with the Seto et al. findings, researchers at the University of Arizona have recently recorded milliGauss magnetic field oscillations adjacent to the hands of Reiki healers (Schwartz & Simon, 2007). Hisamitsu, Seto, Nakazato, Yamamoto, and Aung (1996) found that practitioners of Qigong breathing exercises emit strong whole-body magnetic fields in the milliGauss range. And, in a preliminary study using a SQUID detector in a magnetically shielded room, Zimmerman (1985) observed magnetic field variations adjacent to the hands of a Therapeutic Touch practitioner. These findings suggest that magnetic field recordings may provide a useful measure of bioenergy healing and mind–body practices. In this pilot experiment, we examined whether magnetic field variations occur during hands-on healing and distant healing using the experimental model developed by Bengston and Krinsley (2000).

Methods

Animals

C3H/HeJ female mice (6–8 wks old, obtained from The Jackson Laboratory) were injected with mouse mammary adenocarcinoma tumor (H2712, obtained from the National Cancer Institute Biological Testing Branch). Tumor brei, suspended in sterile RPMI-160 cell culture medium with 20% normal mouse serum, was implanted subcutaneously with a syringe with a 19-gauge needle (0.2–0.3 ml total volume), near the abdominal mammary gland (day 0). Following tumor injection, the animals (n = 120) were evenly distributed across six experimental groups (G1–G6, Table 1), with each group housed in one of five different animal rooms or buildings.

One injected group (G1) was treated by the healer William F. Bengston and housed in an animal room painted blue (BLUE1) (Table 1). A second group (G2) was injected with tumor fragments (+) and left untreated. This group was housed with a third group (G3), an uninjected control (−), in a WHITE-walled room. Three additional groups were injected with tumor fragments and housed in separate rooms: One group (G4) received sham treatment (GREEN), another (G5) was housed in a room painted an identical color to the treated group

TABLE 1
Experimental Mice Groups Distributed across Five Different Rooms, with (+) or without (–) Tumor Injection, and Type of Treatment

Group	G1	G2	G3	G4	G5	G6
Room	Blue1	White	White	Green	Blue2	Bldg2
Tumor	+	+	–	+	+	+
Treatment	Healer	None	None	Sham	None	None

(BLUE2), and the last group (G6) was housed in a different animal facility (BLDG2). The rooms were painted different colors to try to isolate the healing effect and to direct the healer's attention to one room (BLUE1).

Hands-On and Distant Healing

On days 1–2 following tumor injection, Bengston administered hands-on healing (approximately 30 min/session and 1–2 sessions/day) to each cage of animals in BLUE1 (G1). After returning to his home in New York, and throughout the rest of the experiment (12 wks), Bengston included an image of a "successful experiment" in his daily practice of "rapid mental imaging" (Bengston, 2007), which is a purported form of distant healing. During the third and fourth weeks, Bengston participated in three scheduled distant healing sessions, with each session lasting approximately 20 min in duration. The healer was provided recent photos of the mice in BLUE1 (G1), but had no contact with and no knowledge of mice in groups G2–G6. Sham treatment of animals in the GREEN room (G4) occurred at the same time as the healer's hands-on and scheduled distant healing treatments. Sham healing was done by one of two students with no training in energy healing. During the hands-on healing sessions, one student sat in the GREEN room with the mice. Before each distant healing session, the student received a recent photo of animals in the GREEN room. While the distant healer worked on mice in BLUE1, the student held positive thoughts ("cute mice") and feelings toward the mice in the GREEN room.

Blood Parameters and Tumor Size

At 1 wk, 2 wks, 4 wks, and 12 wks post-injection, six mice from each group were sacrificed for blood and tissue samples. Tumor and spleen size (surface area, mm^2) were measured with a caliper. Blood samples were analyzed with an automated blood counting system (Abbott).

Magnetic Field Recordings

Before, during, and after each healing session, magnetic field activity was continuously recorded with a DC Hall-type magnetometer (Integrity Design, model IDR-321) connected to a recorder (iWorx, model 214) with input to a PC with analysis software (Labscribe). For hands-on healing sessions, the Hall-type sensor was positioned 1–2" below the animal cage. The healer (Bengston) placed his hands near the cages without touching the mice, for approximately 20–30 min per session or until he felt the session was "over". For distant healing sessions, the Hall-type sensor was positioned in each animal room, specifically in the middle of the cage rack (which was composed of plastic) surrounded by the plastic mice cages (with metal lids). The local magnetic field environment during the distant healing sessions was compared with historical Kp data from the NOAA Space Weather Predictions Center (2006). Moga executed the experiment, interpreted the results, and prepared the manuscript. Bengston provided healing and qualitative feedback during the experiment, and reviewed the manuscript. This study was approved by the Indiana State University Institutional Animal Care and Use Committee and the Indiana University–Purdue University Indianapolis Institutional Review Board.

Results

This pilot experiment was originally designed to test the hypothesis that hemoglobin levels are positively affected by energy healing, as suggested by the findings of Krieger (1976). Hence our focus was initially on blood parameters, with incidental measurement of tumor size and magnetic field activity. Overall, we observed no significant differences in hemoglobin levels or the differential white blood cell count across the different experimental groups at any timepoint. However, we did observe a decrease in tumor incidence across all groups as the experiment progressed (Figure 1), with 75% of the surviving mice tumor-free at 12 wks post-injection. We previously reported tumor regression in mice with small tumors, but not large ones (Moga & Zhou, 2008).

To duplicate the results of earlier magnetic field studies, we initially tried recording the magnetic field adjacent to Bengston's hands, body, and head as he did hands-on healing, but observed no changes in the magnetic field. When we placed the Hall-type sensor adjacent to the mice cage as Bengston treated the animals, we observed distinct magnetic field oscillations (described below). Thereafter, we placed the sensor close to where the healer's attention was focused (i.e. the mice in their cages), during hands-on and distant healing sessions.

The magnetic field activity in each healing session consisted of "baseline" or quiet periods (Figure 2A) punctuated by short periods (1–3 min) contain-

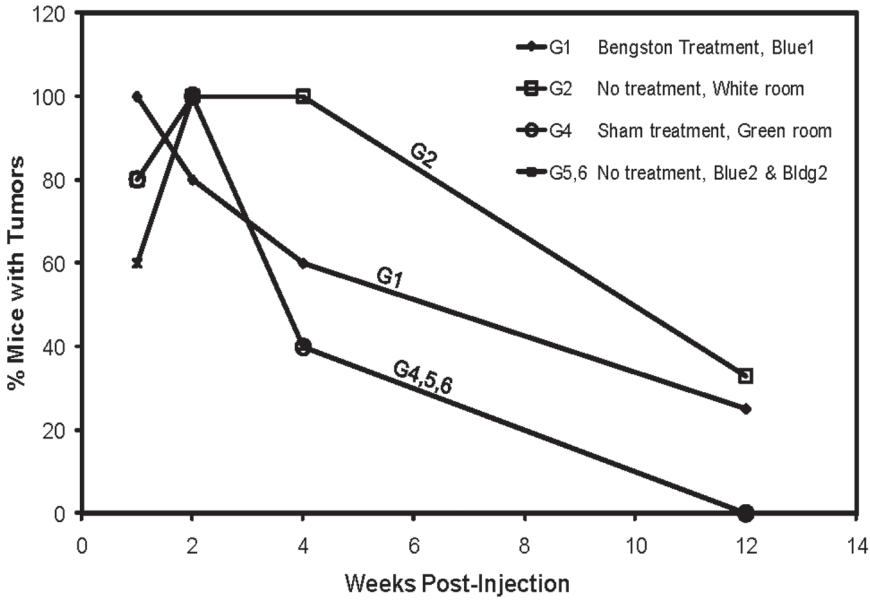

Figure 1. Percent of mice with palpable tumors in 5 different experimental groups following injection of tumor cells at wk 0. Tumors developed rapidly within 2 wks following injection. All groups showed a decrease in tumor incidence during wks 4–12.

ing magnetic field oscillations (Figure 2B–2E). The magnetic field (MF) oscillations showed greater peak-to-peak variation than baseline, and displayed a symmetrical wave-like appearance, which resembled "chirp waves" found in electronic applications. "Chirp waves" are defined as discrete packets of sinusoidal waveforms that decrease or increase in frequency over time. The MF oscillations in the present experiment showed an initial decrease in frequency followed by an increase in frequency. In Figure 2B and 2D, note the portion of the trace containing the very slow oscillations; this portion is the "center" of the wave, and represents the transition point between decreasing and increasing frequencies. Part of the trace in Figure 2B (indicated by the line marked C) is expanded and illustrated in Figure 2C, and part of the trace in 2D (marked E) is expanded and illustrated in Figure 2E, to better show the slowing of the magnetic field frequency during a "chirp wave." Through Fast Fourier transform analysis, we observed that the MF oscillations or "chirp waves" initially displayed 20–30 Hz frequencies, which slowed to 8–9 Hz, and then to less than 1 Hz, at which point the wave reversed and increased in frequency. The MF oscillations or "chirp waves" ranged from 1–8 milliGauss in strength and 60–120 sec in duration.

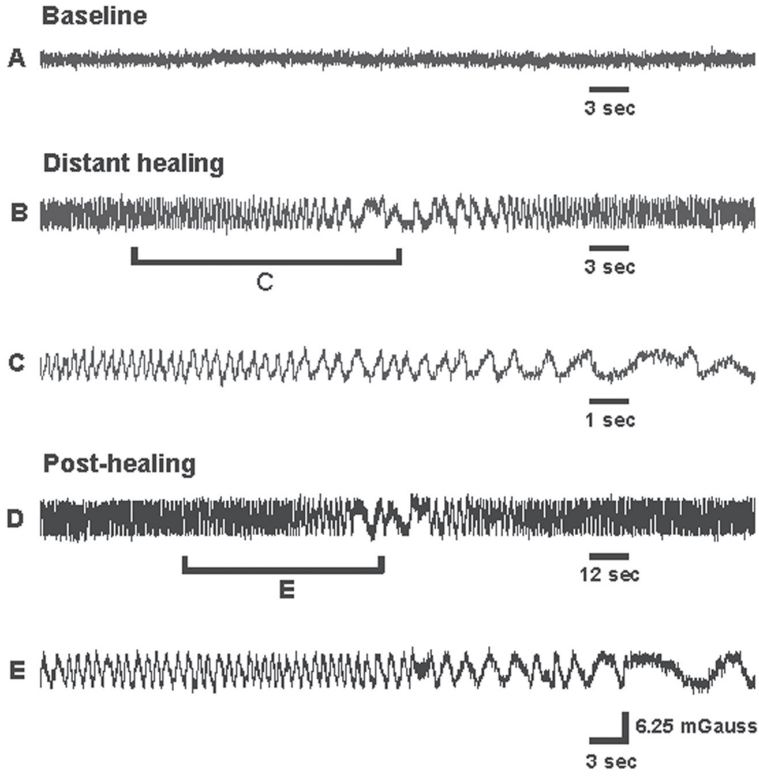

Figure 2. Percent of mice with palpable tumors in 5 different experimental groups following injection of tumor cells at wk 0. Tumors developed rapidly within 2 wks following injection. All groups showed a decrease in tumor incidence during wks 4–12.

In the first two scheduled distant healing sessions, we recorded magnetic field activity with a sole magnetometer located adjacent to the mice cages in BLUE1. In the first session, we detected 5 magnetic field oscillations in 2:20 hr, and in the second session 7 oscillations in 2:15 hr, with the oscillations concentrated during and after each 20–30 min healing session. On a non-scheduled day, we observed 0 oscillations in 2:00 hr. In the last scheduled session, we increased the number of magnetometers used and recorded magnetic field activity in four different rooms simultaneously (Table 2). In Table 2, MF oscillations (•) are listed by local time of occurrence (CST = Central Standard Time) and the room where they were recorded. Magnetometer probes were positioned in three different animal rooms (BLUE1, WHITE, BLUE2) and in a small administrative office (OFFICE, "no mice") in the animal facility. The WHITE room

TABLE 2

Distribution and Number of Magnetic Field (MF) Oscillations (•) in Four Different Rooms During a Distant Healing Session

Time		Rooms			
	Local Time (CST)	Blue 1 - Bengston	White - no tumor	Blue 2 - no treatment	Office - no mice
Before the distant healing session	10:40		•		
	10:58			•	
	11:00		•		
	11:20		•		
	11:21	•			
	11:25			•	
	11:42		•		
	11:50		•		
	11:51				•
	12:00	•	•		
	12:04	•			
During the distant healing session by Bengston	12:22	•			
	12:30	•			
	12:36	•			
	12:41		•		
After the distant healing session	12:51	•			
	12:58	•			
	13:11	•			
	13:25	•			
	13:36	•			
	13:45	•	•		
	13:49		•		
	13:55				•
Total MF oscillations per room:		12	9	2	2

contained two groups: healthy uninjected animals ("no tumor") and mice with tumors that received no treatment ("no treat"). In this distant healing session, we observed an increase in the number of MF oscillations during and immediately after the distant healing session (Table 2). Magnetic field oscillations were more numerous in the BLUE1 (healer-treated) and WHITE (healthy, no tumor) rooms than in the other two rooms examined. The Earth's magnetic field on each of these four days was relatively quiet, with no evidence of any major geomagnetic storm (NOAA SWPC, 2006).

To determine whether this wave was "real" or an electronic artifact, we did additional recordings after the experiment was completed. We recorded magnetic field activity in the same animal rooms and in other buildings (e.g., home, laboratory); and during other bioenergetic practices, including Tai Chi and Qigong workshops, a mindfulness group meditation, a spiritual healing retreat, and in Healing Touch, Reiki, and craniosacral therapy sessions (Moga & Geib, 2009). During a weeklong Tai Chi workshop, we observed identical waves, but of longer duration, in 7 out of 9 classes recorded. In 4 out of 4 Healing Touch sessions, an increase in the DC magnetic field began 10–15 min after the session started, followed by the characteristic "chirp waves". More complex waves, but with the same symmetrical "chirp" infrastructure, were recorded at a spiritual healing retreat. Waves were absent at the Qigong workshop, during the group meditation, and during the Reiki and craniosacral therapy sessions, although the Reiki session was notable for a quieting of the magnetic field. Our preliminary evidence suggests that these "chirp waves" are not room- or building-specific, and not healer- or practice-specific, but may be associated with the duration, intent, and expertise of particular individuals during mind–body practices.

Discussion

Magnetic Field Oscillations

In this pilot experiment, we observed magnetic field oscillations during hands-on and distant healing sessions with healer William F. Bengston that closely resembled the magnetic field oscillations described by Zimmerman (1985) and illustrated in Oschman (2000). Zimmerman recorded magnetic field activity adjacent to the hands of a Therapeutic Touch practitioner using a SQUID magnetometer in a shielded room. His recorded signal (illustrated in Oschman, p. 87) shows a slowing of the magnetic field frequency, similar to representative waves in our experiment (Figure 2C and 2E). Limited evidence-to-date (Zimmerman, 1985, Seto et al., 1992, Hisamitsu et al., 1996, Schwartz & Simon, 2007, Moga & Geib, 2009) suggests that magnetic field oscillations may be a common feature of bioenergy therapies and mind–body practices.

The healer's hands may not be the optimal site for detection of healing energies. Seto et al. (1992) noted magnetic field changes adjacent to the hands of only a small percentage of Qigong healers (3 out of 37 healers). In this experiment, we readily observed magnetic field changes at the site where the healer targeted his attention, in this case the cages containing mice with tumors, rather than along the body surface of the healer. In remote viewing studies, investigators have made a similar observation where they noted physical changes at the remote viewing target (Puthoff, 1974, Osis & McCormick,

1980, Hubbard, May, & Puthoff, 1986). For example, Puthoff (1974) recorded magnetic field changes when a remote viewer "looked" inside a magnetometer. Several groups have noted an increased number of photons at remote viewing targets, which increased with the accuracy of the viewing (Hubbard et al., 1986; for review, Swanson, 2003). Our results suggest that hands-on healing may be similar to remote viewing in its use of nonlocal mechanisms, and may involve more than a simple transmission of energy through the hands or body of the healer.

Because the present experiments were done in an open environment without shielding of any kind, there is the possibility that the magnetic field oscillations ("chirp waves") recorded here may be artifact. Chirp waves have been recorded under a variety of man-made and natural circumstances. The most commonly observed would be "spread-spectrum waves," which are used in modern technology, including wireless technology, biomedical applications (e.g., ultrasound), and physiological research. The frequency ranges of spread-spectrum waves are generally higher than those detected here, with the possible exception of ELF telephone ring tones. Another possible source for the oscillations would be the earth's magnetic field. Magnetometer arrays used in the study of the earth's magnetic field occasionally detect a "chirp" wave event (e.g., Mann, Milling, Rae, Ozeke, Kale, et al., 2008). Some low-frequency seismic waves, particularly the compression or P wave, can have a symmetrical "chirp" appearance. Gravitational waves emitted by neutron stars are complex "chirp" signals. The presence of man-made and natural ELF chirp waves in the everyday environment highlights the need for further study of healers and bioenergy healing in magnetic field–free, shielded rooms.

Bengston's Method

The decrease in tumor incidence over the course of the experiment is consistent with previous reports by Bengston and colleagues of tumor regression in response to "mental healing" (Bengston & Krinsley, 2000, Bengston & Moga, 2007). As in these earlier experiments, all of the animal groups, control and experimental, showed a response, not just the group in BLUE1. Bengston attributes this group response to a "resonance effect" (Bengston & Moga, 2007). As a possible contributory factor to the resonance effect, Bengston's mental image used daily in this healing experiment (described below) was global and not specific to the animals in BLUE1. The early studies of hands-on healing in mice demonstrated significant differences between experimental and control groups (Grad, Cadoret, & Paul, 1961, Grad, 1965), indicating that the bioenergy healing of all groups, both control and experimental, may be healer-dependent (e.g., Bengston) and not a fixed law.

A unique feature of Bengston's healing technique is his cycling of mental images during a felt emotion (Bengston, 2007). As emotions occur, Bengston merely observes the emotion, without getting caught up in it, while cycling through a series of images. According to multiple sources and traditions (e.g., psychology, spiritual, occult), an individual can free up his or her energy and generate "power" by witnessing/observing his/her emotions and bodily feelings without attachment (e.g., Mindell, 1993, Schrödter, 1999, Windrider, 2006). The combining of emotional awareness with strong mental imagery appears to be a potent mix, generating some sort of "magnetic current" or force. Dr. Joseph Gemasser, a hands-on healer, observed in his own work that "emotional forces are mobilized by meditation, switching on the 'life currents' which are passed to the client" (Schrödter, 1999). According to Butler (1977), practitioners learn to redirect their emotional energy, whereby "the available magnetism may be increased not merely by the release of suppressed energies but by an increase in the actual intake of those energies." We speculate that, through development of his mental and emotional bodies, Bengston has learned, in shamanic language, "how to generate power" (Mindell, 1993).

The specific content of the images may also be important. Some healers and healing traditions use dynamic imagery; for example, images of light moving through the body or affected part, removing obstructions and foreign material (e.g., Adam, 2006). Other healers (e.g., Bengston) use relatively static images such as an image of a healthy body and the healing already completed. In the present experiment, Bengston held an image of the lab personnel toasting the completion of a successful experiment. As another example of this type of imagery, healer Agnes Sanford (1983) would make a picture in her mind of the body, ". . . well and perfect and shining with God's light," and encouraged her patients to do the same. For Bengston, the mental images represent goals or wishes—what he would like to see happen in his life (Bengston, 2007). The mental imagery used by the healer may be more effective if it is personally appealing and arouses positive emotions (Schrödter, 1999). For self-healing, Adam (2006), known as the "DreamHealer," advises people to "send yourself an intense message of what you want and focus on that." Windrider (2006) has observed that his guru, Sri Bhagavan, heals through *sankalpa* or "strong wishes." Bengston's healing method may be a "strong wish," linking emotional energy with a clear mental goal.

In some healing sessions, Bengston felt energy moving through his body—originating in the parietal areas of his head, moving down his arms and out of his hands. This felt movement of energy is typical of a "magnetic healer" (Meek, 1977). Karagulla and van Gelder Kunz (1989) observed that magnetic healers, "generate a flow of etheric energy from their head to their hands—and to the affected part held between their hands." Other examples of magnetic healing

would be Reiki, Healing Touch, and Deeksha. In Reiki, the healer places his/her hands on a client and allows the "Reiki energy" to flow through them as needed by the client (Miles & True, 2003). Healing Touch practitioners (Slater, 1995) feel "a slow weak current" through their hands in their work with clients. Slater (1995) speculates that this current may correspond to the DC current detected in the experiments of Becker and associates (Becker & Selden, 1985). After receiving Deeksha attunements, Windrider (2006) observed that "strong currents would start streaming out of my right hand as I visualized people," and "as I continued to give Deeksha to more and more people, it happened more and more quickly, until eventually, with just a thought, the current would pulse through and go where it was needed." In general, magnetic healing involves a flow of "energy," some sort of current, through and out of the hands or body of the practitioner to the client.

Bengston's healing process differs from the sham healing (i.e. "cute mice") in several respects: 1) Bengston cycles a well-defined thought-form (or image) of the accomplished healing at frequent intervals, 2) he has established a strong connection between his emotions and the thought-form, and 3) he may have developed some sort of neurocircuitry to move large currents through his body (Windrider, 2006). The sham healers expressed sympathy for the mice and retained positive thoughts, but these thought-forms were not well-defined and not specifically connected to their largely unconscious emotions. According to Butler (1977), "most of the thought-forms created by the average person never leave the aura of their creator." Discussion of "thought-forms" may seem overly speculative; however, electroencephalograms (EEGs) are currently being used to detect specific thought-forms or "commands" to power technology for individuals with special needs (e.g., McFarland, Krusienski, Sarnacki, & Wolpaw, 2008).

Energy Healing: A Proposed Mechanism

In a landmark study, Green, Parks, Guyer, Fahrion, and Coyne (1991) recorded electrical voltage surges in body-potential of healers during distant healing, which led them to hypothesize that bioenergy healing may involve an increase of charge in the healer's body, followed by an emission of charge. Further analysis by Tiller, Green, Parks, and Anderson (1995) suggests that, "training and practice develops in the healer a somewhat automatic internal power buildup that discharges periodically and generates a very large electrical voltage pulse in the physical body." A buildup of charge in the body and periodic discharge may not be limited to healers, but may be a fundamental principle of health and healing. In an early treatise, Baines (1918) proposed that the human body functions as an electrical condenser, accumulating charge generated by cell currents in the body. Our preliminary data suggests that bioenergy healing and mind–body practices such as Tai Chi may help release accu-

mulated charge. During a magnetic field recording in a Tai Chi class, a student sat down next to one of our DC magnetometers. She yawned and stretched, and a magnetic field oscillation appeared on the screen, as if it had rolled off her body. At that moment, it seemed evident that these oscillations represent some sort of discharge. Future experiments will examine possible factors affecting the charge–discharge process, which, if optimized, could lead to more effective healing and mind–body practices.

Bioenergy healing may involve a quantum entanglement process between healer and healee, with changes in the vacuum in and around the healee, resulting in a measurable EM signature (e.g., a "chirp wave" or biophotons). In quantum theory, Bell's theorem proves the existence of an invisible nonlocal reality—a seamless whole—where two objects (e.g., healer and healee) connected through past experience or knowledge can affect each other at a distance with no physical connections linking the two (Herbert, 1985). "The mind/brain might be a self-observing quantum object . . . within an entangled, nonlocal medium" (Radin, 2006). Radin (2006) theorizes that the unconscious mind may be connected to other individuals (e.g., family members) at all times, but we may only be conscious of this entanglement in times of danger or special meaning. In contrast, the healer may have learned how to "surf through the entangled unconscious" at will, picking up information and effecting change at a distance. Through entanglement, the healer's intent and focus may change the "bivacuum" of the healee (Sidorov, 2002). Sidorov (2002) notes that unusual electromagnetic signals have been detected around both sender/healer and target/healee in distant healing and remote mental interactions; he describes these anomalous signals as "electromagnetic signatures." Healing may involve some new type of association with electromagnetic waves which allows a specific intention to interact with the target. According to the theoretical model of Tiller, Dibble, and Kohane (2001), distant healing is thought to occur via R-space, the coarsest level of the vacuum. Reciprocal space, or R-space, is an approximate coordinate system for describing the behavior of de Broglie-type waves in a conjugate physical space. Direct space, or D-space, is a satisfactory coordinate system for describing the behavior of particles in everyday physical space. The mind of the healer imprints R-space, which is coupled with D-space of the healee through "deltron substance," the emotional domain. The intensity of human intention influences the magnitude of C_{δ} or deltron substance.

Bioenergy healing may simply be a biodynamic process whereby 1) the healer, through training or initiation, alters his own bivacuum or "R" space with thoughts of healing the mice, and 2) through quantum entanglement, his healing thoughts alter the bivacuum ("R" space) of the mice, which generates an electromagnetic signature in "D" space, resulting in healing of the tumors. As some readers may have observed, there is a fundamental contradiction in the

present experiments, where the healer is participating in experiments that deliberately sicken and later euthanize the same mice he is trying to heal. Indeed, one healer we approached refused to participate based on the intentional harm we did to the animals. The fact that healing occurred in these "paradoxical" experiments suggests that the healing process may work independently of any moral framework (e.g., the Buddhist precept of "nonviolence"), regardless of how the animals are made sick or how they will die. Future experiments will try to elucidate basic principles of this biodynamic process, with particular focus on the "electromagnetic signature," which may serve as a measure of a healer's ability to imprint "R" space, as well as an indicator of the healing process.

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