

EFFECTS OF INTENTION, ENERGY HEALING, AND MIND-BODY STATES ON BIOPHOTON EMISSION

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"The most beautiful thing we can experience is the mysterious. It is the source of all true art and science." —Albert Einstein

ABSTRACT: Beyond life as a biochemical system, endogenous and exogenous energy fields play an important role in the living state. The biofield, the energy field associated with life, consists of low intensity electric, magnetic, and electromagnetic fields that may be key to health and healing. Here we measured one component of the biofield, the ultraweak light emitted from the body—biophotons—and explored the influence of intention, extraordinary mind-body states, and human interaction on biophoton emission. Three pilot studies were conducted to investigate whether biophoton emission is a biomarker correlated with intention. Results showed that (1) biophoton emission from healers' hands diminished significantly by 11% post-healing; (2) biophoton emission during energy healing showed a unique pattern for each treatment session; (3) changes in biophoton emission from the forehead, heart, and abdominal regions of patients pre-post energy healing showed no discernible pattern for a small number of diverse patients; (4) subjects who engaged in bioenergetic practices emitted more biophotons from specific bodily regions, some in alignment with their intent. Biophoton emission was found to be modulated by intention, energy healing, and bioenergetic mind-body practices. Biophotons might potentially be involved in quantum or quantum-like entanglement between humans, and may play a role in energy healing, biocommunication, and altered mind-body states.

KEYWORDS: Biophoton; Ultraweak light emission; Biofield; Subtle energy; Energy healing; Spiritual healing; Bioenergy; Volition; Intention; Consciousness; Mind-body; Dantian; Oriental medicine; DMILS (direct mental intention on living systems)

INTRODUCTION

Besides the dominant biochemical view of life, there is a biophysical view pertaining to the bioelectronics and energy fields of the organism. Proteins and other biological constituents exhibit semiconductor properties whose functions may be influenced by photons, electrons, and magnetic fields. Therefore, the living state involves a coupling of biochemistry and energy fields. This means that organisms process information not only through the senses and biochemically-sensitive receptors. Information is also conveyed through endogenous and exogenous energy fields. The endogenous energy fields are ultraweak in intensity, but span a large energy spectrum. The electromagnetic radiation emitted from the human body spans across a vast range of the spectrum, from extremely low frequencies to thermal (infrared), and visible light (studied here), to gamma radiation (from natural potassium-40).

All organisms including humans continuously and spontaneously emit light from 200-750 nm, in the ultraviolet and visible spectrum, from a few to ~100 photons per cm² per second, measured as counts per second (cps) using a photomultiplier tube placed on the skin. [1] This is called biophoton emission. Photon wavelengths below 314nm are capable of ionizing cesium, and below 124nm all photons are considered ionizing. Thus, the biophoton energy spectrum borders the threshold of ionizing radiation.

There are only small numbers of studies measuring human biophoton emission, and even fewer that investigate the role of consciousness and intention on the light emitted. Systematic measurements of this extremely weak light emitted from the body represent one approach to assessing the radiant nonthermal human biofield that may possess and transmit energy-with-information. According to the biofield hypothesis, changes in biophoton emission might be expected to correlate to changes in health, disease, healing, altered states of consciousness, volition and intention. [2,3,4,5]

We designed and built a customized apparatus with a walk-in dark chamber and photomultiplier tube to measure biophoton emission. During 2012-2015 we conducted three studies on human subjects. The first measured biophoton emission associated with energy healing and examined biophoton changes from the hands pre-post healing. The second study measured biophoton emission pre-post energy healing from the head and trunk. The third study measured biophoton emission changes associated with extraordinary mind-body states in two individuals.

BACKGROUND

Biophoton emission is the ultra-weak visible light emitted from all organisms. In the 1920s Gurvitch first showed that biocommunication between onions occurred by

means of ultraweak light that was emitted when onion cells divided, stimulating growth of other onions nearby, and named it “mitogenetic radiation.” [6] In the 1970s a Russian study showed that infection of one cell culture could be transferred to another through biophotons alone [7], also demonstrating that biophoton emission can transmit vital information.

There are several theories of the origin of biophotons. Some evidence suggests that at least a portion of the light emitted may be bioluminescence from various independent emitters, such as biomolecules containing reactive oxygen species (ROS). [8, 9] Another view is that ROS in collective processes are involved in biophoton emission, and that ROS play an organizing role in the “pumping” of non-equilibrium states that underlie the energy flows and vital processes in organisms. [10] Other evidence suggests that biophoton emission is a quantum coherent signal with distinct decay kinetics, possessing bioinformation that may be involved in biocommunication, energy transfer, and biological regulation. [11, 12]

Biophoton counts from the human body have been mapped. The abdomen emits the least photons, whereas the forehead and hands emit the highest levels with a characteristic distribution pattern. [13] In subjects practicing Transcendental Medicine, biophoton emission is reduced over that of nonmeditators, although the percentage contribution of emission from anatomic regions did not differ significantly. [14] The index and middle fingers were found to emit the highest intensity of light. [15] Biophoton emission is seasonal. It is lowest in autumn from bodily regions other than the palms of the hands, which remain relatively stable over time. [16]

Several studies show a relationship between biophoton emission and Oriental medicine. Acupuncture treatment dramatically reduced any left-right asymmetry of emission associated with disease states. [17] Stimulation of specific acupuncture points enhanced their biophoton emission. [18]

In the remainder of this literature review, we focus on biophoton emission with respect to consciousness. There is theory and evidence that human biophotons may be consciously controlled, at least in part, and transmit information associated with intent. This signal might mediate certain phenomena such as local energy healing. Optical waves can carry enormous amounts of information; e.g., the bandwidth of ultraviolet light with a 0.0001% modulation is 800MHz. This bandwidth could carry information equivalent to 160 television channels broadcast simultaneously. [19]

A dissertation on the influence of intention to alter biophoton emission found that the mean photon count decreased, although many variations within and between subjects were observed. [20] Measurements made from the hands and foreheads of five meditators showed that biophoton emission decreased after meditation. [21] At Rhine Research Center, 100 subjects including meditators were studied to see if they could

control biophoton emission. [22] They found that a change in intent could produce spikes of 400-600% more biophotons over baseline, and moreover, feedback improved some subjects' performance.

The influence of qigong on fingertip biophoton emission was studied in 4 subjects. [23]. In one subject, light emission increased significantly during intent to project external *qi* (subtle energy) and decreased during relaxation.

Recent investigations reveal that there could be an inherent connection between biophotons, which are of localized human origin, and nonlocal human-machine interactions (via quantum processes) on a random number generator producing deviations from randomness. This suggests that a correlative variable for intent may be biophoton emission. [24] Some speculate that the burst of biophotons purportedly emitted at the moment of death may be related to unusual phenomena, such as the malfunctioning of electronic devices, observed at the time of death. [25]

No biophoton studies on humans interacting during energy healing have been reported in the literature to date. Therefore, two of the studies we report here are exploratory.

RESEARCH QUESTIONS

We conducted three pilot studies to investigate four research questions:

1. Is there any change in biophoton emission from the hands of the biofield practitioners and their patients, immediately before and after energy healing?
2. Can biophotons be measured during energy healing sessions inside the dark chamber?
3. Does energy healing performed by a biofield practitioner affect biophoton emission from the forehead, heart, and abdominal regions of patients?
4. Does biophoton emission of a practitioner increase from a specific region of the body upon intent to increase it?

GENERAL METHODS AND PROCEDURES

Our detection system consisted of a photomultiplier tube (PMT) operated as a single photon-counting detector along with pre-processing electronics (pulse-shaping and signal discrimination), pulse-counting hardware, and input into a computer for data acquisition, display, and logging for offline analysis. The PMT used was a head-on Hamamatsu model H7360-01SEL, with ultra-low dark count of 15 counts per second (cps), an aperture of 22 mm diameter, and photon sensitivity from 300-650nm. It was

mounted to a dental lamp balanced boom that offered six degrees of freedom of mobility, such that the PMT could be placed anywhere on a subject's body for biophoton measurement and remain stationary. A cooling system for the PMT was deemed unnecessary, since an acceptable dark count rate (~ 15 cps) could be achieved at ambient room temperature. On cooler days, the dark count decreased to ~ 7 cps.

A dark chamber, 1.22 x 1.22 x 2.44 meters, was constructed from plywood with sealed butts, a baffled door, and the interior painted flat black to minimize stray light. The lamp boom with PMT was mounted inside the chamber on a sliding rail. The chamber could accommodate two subjects and one experimenter, all seated. The chamber was aerated by two fans in push-pull operation with inlet and outlet baffles to prevent light leaks.

A second researcher situated outside the chamber at the computer interacted with the detection system through a custom-programmed graphical user interface (GUI). The data acquisitions system included the GUI and National Instruments data acquisition hardware, model NI USB-6212 (16 analog inputs, 16-bit resolution, 400kS/s sampling rate), which is a multifunction input/output external USB card. This was attached to an Asus notebook computer (Windows 7). The GUI was programmed in National Instruments LabVIEW 2010 software package (Version 10.0) for data acquisition, logging, and analysis. Photons were counted for one second, and the resultant sum was logged. Thus, the cps rate was sampled once per second and represents the average value during that second. Harry Jabs, who designed and constructed the equipment, operated the equipment outside the chamber and collected data. Beverly Rubik worked inside the dark chamber with the subjects, strategically positioning the photomultiplier to measure biophoton emission. A protocol was adopted whereby 2-minute measurements of target areas were alternated with 2-minute PMT dark count (baseline) by pointing the PMT against the interior wall. Rubik and subjects wore black clothing to reduce stray light. Rubik also wore a black mask and black gloves to block out her biophoton emission. Figure 1 shows the chamber interior illustrating a simulated measurement.



Figure 1. Rubik (left) making a simulated measurement with PMT placed on the palm of the hand of subject (right). Actual measurements are made in complete darkness.

The equipment was warmed up for at least 30 min, and dark count rate, which is due to electronic noise and natural background nuclear radiation, was measured with the PMT shutter cap on and then off for several minutes. This test was done to confirm that both dark count rates were the same. A higher dark count with the shutter cap removed would indicate a light leak in the chamber. A trial began when the PMT was positioned on a subject's hand or other bodily region for 2 minutes to count biophotons. Between each subject measurement, the PMT was positioned against the wall of the dark chamber for 2 minutes to measure the dark count rate (baseline measurement). A specific sequence of measurements, including the palm of the hand among other bodily regions, was performed for each subject. Specific procedures that pertain to each study are described in their respective sections.

MEASUREMENTS ON BIOFIELD PRACTITIONERS AND PATIENTS, PRE-POST ENERGY HEALING AND DURING HEALING SESSIONS

The purpose of this initial study was to address research questions (1) and (2): to look for any change in biophoton emission from the hands of energy practitioners and patients before and after energy healing, and to count photons, if any, emitted during

the healing session. Five energy healing sessions were assessed using five practitioners and three patients, previously unknown to each other. The energy healers, from 43 to 78 years of age (mean 57.6 years) practiced different types of biofield therapy, such as Reiki, external *qi*, and mixed modalities, from 8 to 40 years (mean 19.3 practice years). Patients reported having acute or chronic pain. Patients were randomly paired with practitioners, and one practitioner-patient pair was used in each experimental session. Subjects gave written informed consent, and the research protocol was pre-approved by an Institutional Review Board.

Pairs of subjects were assessed by appointment. Investigator Rubik, practitioner, and patient entered the dark chamber and performed the following experimental procedures.

1. Wait 10 min for PMT dark count to stabilize.
2. Measure left hand palm of healer, 2 min.
3. Baseline measurement, 2 min.
4. Measure right hand palm of healer, 2 min.
5. Baseline measurement, 2 min.
6. OPTIONAL: Measure left hand “sword” fingers of healer, 2 min.
7. OPTIONAL: Baseline measurement, 2 min.
8. OPTIONAL: Measure right hand “sword” fingers of healer, 2 min.
9. OPTIONAL: Baseline measurement, 2 min.
10. Measure left hand palm of patient, 2 min.
11. Baseline measurement, 2 min.
12. Measure right hand palm of patient, 2 min.
13. Healer conducts 20 min energy healing session on patient while PMT was placed in center of chamber above subjects, pointed downward.
14. Baseline measurement, 2 min.
15. Repeat steps 2-12 for post-healing measurements.
16. Power off PMT; measure electronic baseline.

After exiting the dark chamber, subjects completed an exit survey to assess their level of relaxation, wellness, and satisfaction with the session. Heart rate variability (HRV) of the practitioners was measured for 5 minutes using a finger plethysmograph and HRV monitoring device (Medicore SA-3000p) as an objective measure of relaxation and autonomic nervous system balance. Ideal healthy values of the LF/HF (low frequency to high frequency power ratio) range from 0.5-1.5, which signifies sympathetic-parasympathetic balance. Figure 2 (following page) shows the subject demographics and their scores. Post-healing self- assessment scores are high on the Likert scale of 1-10, indicating that the energy treatments were relaxing and satisfying to the subjects.

				Biofield	Years	Dom	Health	HRV	Relax-	Well	Satis-
<u>Subject</u>	<u>Age</u>	<u>Sex</u>	<u>Race</u>	<u>Practice</u>	<u>Practice</u>	<u>Hand</u>	<u>Issue</u>	<u>LF/HF</u>	<u>ation</u>	<u>being</u>	<u>fact.</u>
H1	43	F	C	Mixed	14	Right	-	1.46	10	10	10
H2	78	F	A	Qigong	40	Right	-	2.32	10	10	10
H3	42	F	C	Reiki	14	Left	-	3.18	9	9	10
H4	69	M	A	Mixed	8	Right	-	2.38	10	10	10
H5	56	M	A	Qigong	40	Right	-	0.65	9	7	6
P1	72	F	C	-	-	Right	Back Pain	-	8	9	9
P2	61	F	C	-	-	Right	Pain	-	8	9	8
P3	47	F	C	-	-	Right	Pain	-	10	9	10
P4	61	F	C	-	-	Right	Pain	-	9	9	9
P5	72	F	C	-	-	Right	Back Pain	-	8	8	8

Figure 2. Subject demographics and post-healing measurements. H=energy healer; P=patient; F=female; M=male; C=Caucasian; A=Asian; Mixed biofield practices indicate self-developed combinations of biofield modalities; Dom=dominant hand; LF/HF=ratio of low to high frequency power in heart rate variability (HRV); Relaxation, Well-being, and Satisfaction scores are from self-assessed Likert scales, where 10=highest and 1=lowest possible values.

Graphs of PMT counts per second (cps) vs. time were made for the five experimental sessions, H₁/P₁, H₂/P₂, H₃/P₃, H₄/P₄, and H₅/P₅. Typically healers showed greater biophoton emission than patients, although this was not statistically significant. A unique temporal pattern of biophotons was observed for each energy healing session, in some cases correlated to healers' remarks about their perceived energy flow during the session. Figure 3 shows the full session of PMT measurements (raw data) for subjects H₁/P₁.

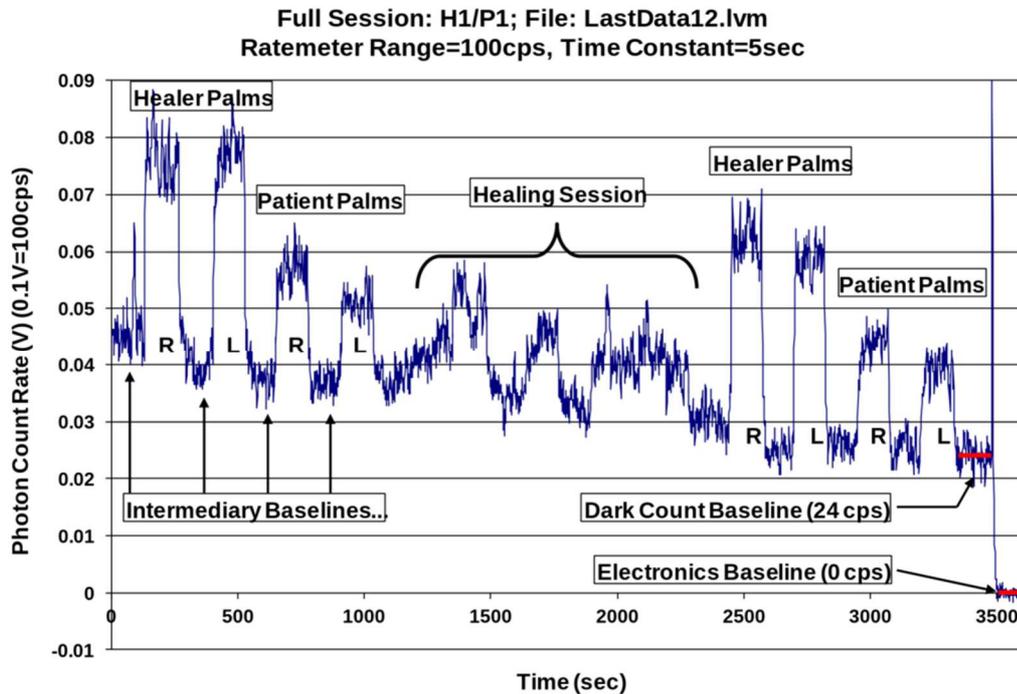


Figure 3. Session with healer, H1, and patient, P1. R=right hand palm; L=left hand palm. Three bursts of light were emitted during the healing session, which were later found to be correlated with the healer's statements during the session about the arrival of her spiritual guide and her perceived increased flow of energy from her hands.

The downward drift in the baseline measurements over time indicated that the PMT background (dark current) was still decreasing from ambient light exposure of the PMT photo-cathode. There is also the expected variation of count rate from second to second, seen as signal fluctuations. These raw data shown were processed to extract the biophoton count rate (signal) by subtracting the dark count (background) from the hand measurements. This was achieved by averaging the count rate over the 2-min signal and dark count intervals. From each hand measurement interval flanked by dark count measurement intervals on either side, it was possible to compensate for the downward drift in the dark count during the course of each experimental session and to calculate the net biophoton counts from the palms with a standard error of approximately ± 0.1 cps. Figure 4 shows the raw data of the session with subjects H2/P2.

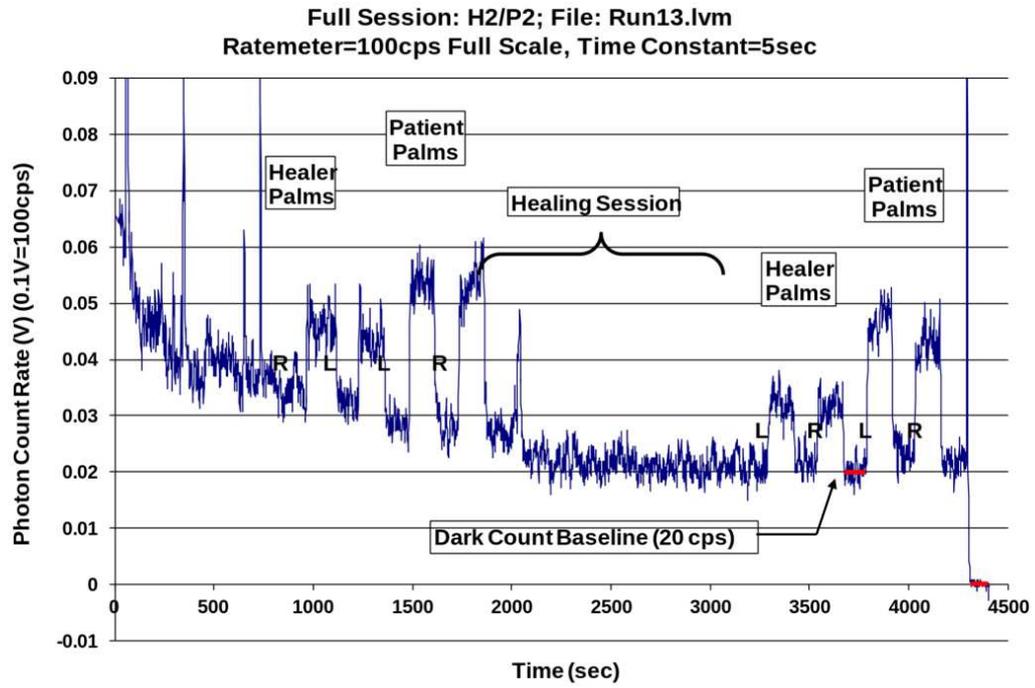


Figure 4. Session with healer, H2, and patient, P2. The energy healing session showed a photon burst early in the healing session.

Figure 5 shows the raw data from the session with subjects H₄/P₄.

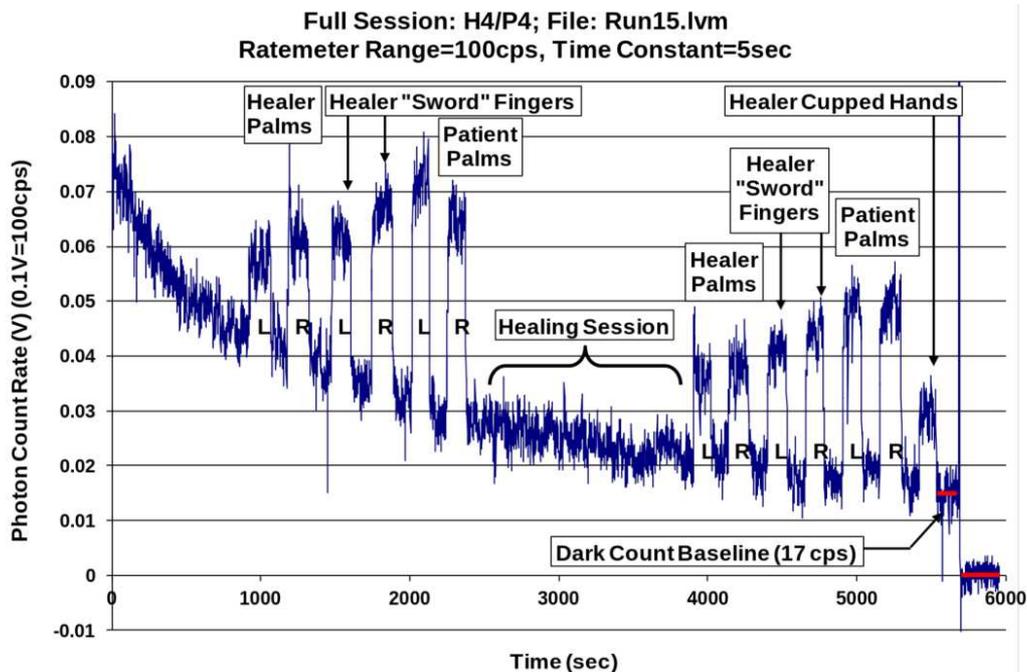


Figure 5. Session with healer, H₄, and patient, P₄. No significant light emission was observed during the healing session. Sword fingers are index and middle finger tips.

Whereas Figure 4 shows a burst of photons early in the energy healing session, Figure 5 does not show much light emission during energy healing, except for a small peak near the end of the healing session. The healer, H₄, a practitioner of external qi , indicated that his sword fingers (index and middle finger) emitted particularly strong energies, so we measured them as shown in Figure 5. At the end of the session, H₄ also cupped his hands around the PMT to send energy, which is the last peak shown. Figures 3, 4 and 5 illustrate the conspicuously different patterns of biophoton emission from the healers, patients, and their energy healing sessions. Figure 6 (following page) is a table of the pre-post treatment biophoton emissions from the hands of all subjects for the five experimental sessions with calculated mean values.

Subject	Pre-Treatment Count Rate (cps)						Post-Treatment Count rate (cps)					
	Healer Palms		Healer "Swords"		Patient Palms		Healer Palms		Healer "Swords"		Patient Palms	
	R	L	R	L	R	L	R	L	R	L	R	L
H1	34	38					34	33				
P1					20	13					19	14
H2	12	12					10	10				
P2					25	24					21	25
H3	7	7					6	8				
P3					17	23					21	18
H4	21	14	32	25			17	15	26	22		
P4					35	41					30	32
H5	29	23	54	41			25	18	44	30		
P5					17	11					14	10
Mean values	20.6	18.8	43.0	33.0	22.8	22.4	18.4	16.8	35.0	26.0	21.0	19.8

Figure 6. Compilation of biophoton measurements for each healer-patient pair along with mean values. Largest emissions are from "sword fingers."

These results were statistically analyzed by paired 2-tailed t-tests. Figure 7 (following page) highlights the most relevant statistical findings for pre-post comparisons.

Biophoton Emission	Mean cps (SEM) Pre-healing	Mean cps (SEM) Post-healing	p-Value
Healer RP	20.6 (5.0)	18.4 (5.0)	0.05*
Healer LP	18.8 (5.4)	16.8 (4.4)	0.21
Patient RP	22.8 (3.4)	21 (2.6)	0.322
Patient LP	22.4 (5.3)	19.8 (3.9)	0.251
Healer R&L	19.7 (3.5)	17.6 (3.2)	0.019*
Patient R&L	22.6 (3.0)	20.4 (2.2)	0.098

Figure 7. Mean values, SEM (standard error of the mean), and p-values calculated by 2-tailed paired t-tests for pre-post biophoton measurements; RP=right palm; LP=left palm; R&L=both right and left hand palms. * indicates statistical significance.

Biophoton emission from healers' right palms diminished 11% post-healing ($p=0.05$), and emission from healers' right and left hand palms decreased 11% ($p=0.019$). Biophoton emission from patients' right and left palms diminished 10%, but this was only a trend ($p=0.098$). For pre-post conditions, no significant change in biophoton emissions of right compared to left palms of healers or patients was found, despite the apparent differences noted in Figure 6. Additionally, for pre-post conditions, no significant difference was found for biophoton emissions of right or left palms of healers compared to right or left palms of patients, respectively.

In conclusion, biophoton measurements from the hands were in agreement with the literature. The largest measured emissions were from the "sword fingers" of external *qi* healers. Right hand emissions were slightly greater than left, consistent with Oriental philosophy of *yang* greater than *yin*. Small but significant reductions in biophoton emission of healers' palms immediately following energy healing were found, especially for the right palm, which, according to Oriental philosophy, is the hand emitting the most energy. No significant changes in biophoton emission were found for patients, although a trend toward reduced biophoton emission was observed. No significant differences were found between biophoton emissions of healers and patients, nor any age correlation, despite the observed differences in Figure 6. Healer (H3) who reportedly did not feel well that day showed markedly low biophoton emission (see Figure 6).

Biophotons were measured in three of the five energy healing sessions; two sessions showed none. In one session (Figure 3), the healer's verbal description of self-perceived

energy flows and arrival of spiritual guides coincided with the light peaks observed. During energy healing the PMT was placed 0.5 meters above the subjects and pointed downwards. Because light intensity diminishes as the inverse square of the distance, and because of the small subtended angle of the detector's distant position, the PMT would have recorded only a small number of the biophotons. Therefore, because biophotons were measured in the stand-off position, it is possible that a substantially higher intensity of light may have been generated during energy healing.

The small number of subjects, the limited number of healing modalities, and the single experimental sessions pose limitations to this study and its conclusions. Further studies with larger samples and multiple experimental sessions would be important to confirm and extend these findings.

HEAD AND TRUNK MEASUREMENTS, PRE-POST ENERGY HEALING

The purpose of the second pilot study was to address research question (3), namely, to investigate whether energy healing changes biophoton emission from the forehead, heart, and abdomen regions of patients. Three female patients, 53-57 years old, suffering from a variety of chronic conditions including chronic fatigue, Lyme disease, Hashimoto's thyroiditis, and fibromyalgia, who were enrolled in a 6-month study utilizing pharmaceutical, herbal, nutritional, and energy healing, were assessed at the 6-month mark for biophoton emission. The practitioner treated each patient outside the dark chamber for approximately 30 minutes using a form of hands-off biofield therapy (taught by Dr. Francesca McCartney at the Academy of Intuitive Medicine, Sausalito, California). Biophoton emission was measured immediately pre-post energy healing from the three dantians (key energy centers) and the right hand palm. Measurements were made for two minutes at each bodily region alternating with baseline measurements as previously described. Results of biophoton measurements pre-post healing and heart rate variability (HRV) are shown in Figure 8.

	Subject 1		Subject 2		Subject 3	
	Pre	Post	Pre	Post	Pre	Post
Forehead	20.0	17.1	29.9	23.6	10.1	13.3
Heart	12.6	9.6	10.5	8.5	11.8	12.2
Abdomen	13.9	6.9	12.2	9.5	5.6	7.2
Right Palm	37.0	20.3	23.3	20.8	21.3	18.0
HRV (LF/HF)	-	-	10.8	1.5	6.3	0.76

Figure 8. Biophoton measurements in cps from bodily regions of 3 patient subjects, pre-post energy healing. Right hand palm was also measured. LF/HF=low-to-high-frequency ratio in HRV.

Whereas Subjects 1 and 2 showed small reductions in biophoton emission post-healing, Subject 3 showed a gain, except for the right palm. However, Subject 3 had experienced acute trauma due to a personal assault at gunpoint the previous night, rendering her a special case. HRV values of LF/HF, a measure of autonomic balance, changed from 10.8 to 1.5 for Subject 2 and from 6.3 to 0.76 for Subject 3, showing reduced sympathetic dominance post-energy healing. HRV measurements were inconclusive for Subject 1 due to her irregular breathing (data not shown).

The results of these biophoton measurements are in agreement with the literature that the forehead and hands emit the highest levels and the abdomen the lowest levels. In conclusion, this study showed small changes, mostly reductions, in biophoton emission from the forehead, heart, abdomen, and the right hand palm immediately following energy healing of 2 patients. Whether the biophoton emission is more evenly balanced between these three key energy centers is unclear and needs further investigation. The sample was too diverse and too small to perform statistics. Nonetheless, the study demonstrates the potential of measuring biophoton emission in tandem with other parameters to investigate energy healing and wellness.

CASE STUDIES ON SUBJECTS PERFORMING BIOENERGETIC EXERCISES WITH CONSCIOUS INTENTION

Two subjects who purportedly have extraordinary control of their energy regulation were measured. Each performed a specific bioenergetic exercise with intention to produce more biophoton emission. Subject 4, female, 57, is a practicing medical intuitive who purportedly can open and close her “third eye”, the dantian (energy center) at the forehead region that is metaphysically associated with intuition. Measurements were made for two minutes at each bodily region alternating with

baseline measurements as previously described. Figure 9 shows the results from 2 trials. The right hand palm, heart, and abdomen showed no significant changes (data not shown).

Trial #	Closed	Open	% Change
1	20.0	41.2	106%
2	17.1	27.7	62%

Figure 9. Biophoton emission in cps measured from the forehead of Subject 4 in two trials. She demonstrates volitional control of her “third eye,” emitting 62-106% more photons when it is open.

Subject 5, a 54-year-old male, is a highly experienced practitioner and teacher from the International Academy of Consciousness (IAC). The IAC develops and teaches techniques that help people achieve out-of-the-body states to explore the multi-dimensionality of consciousness. One technique is the Voluntary Energetic Longitudinal Oscillation (VELO). [26] To perform VELO, one continuously mobilizes an energetic pulse in complete, successive, longitudinal cycles up and down the whole body length, with the objective of producing a cohesive, stationary wave that encompasses the entire energetic body. Induction of the VELO may lead to the vibrational state (VS), considered by the IAC one of the most fundamental resources of lucid psychic self-control. In this case study, the subject was first measured in his ordinary state of consciousness and then while performing VELO. Measurements were made for two minutes at each bodily region alternating with baseline measurements as previously described. The raw data from the PMT are shown in Figure 10.

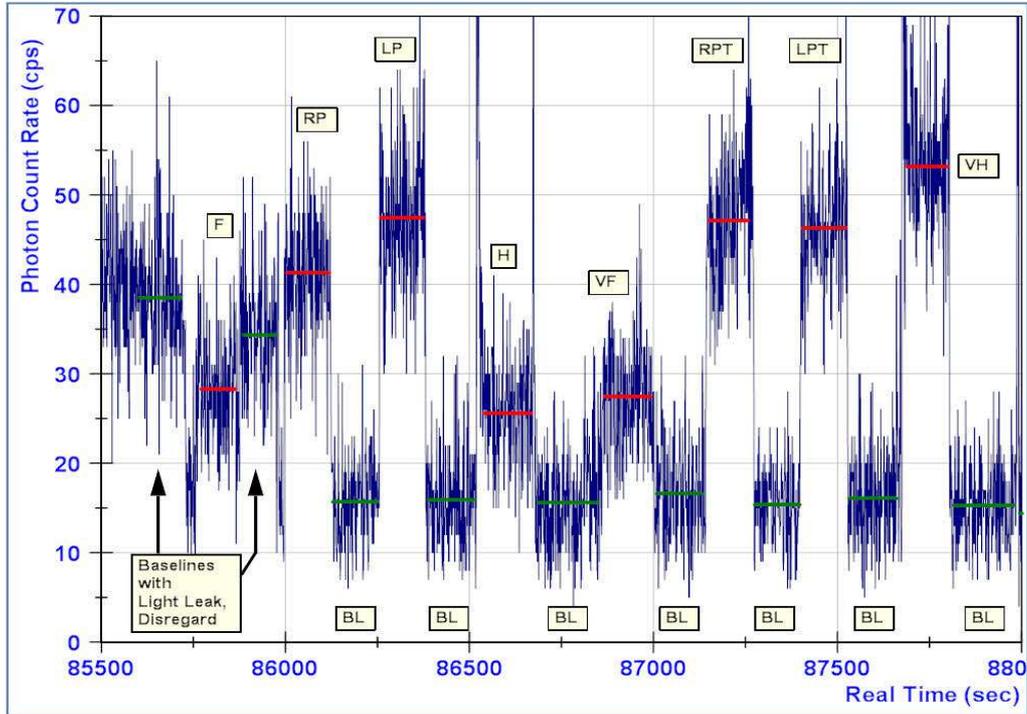


Figure 10. Session with Subject 5 showing biophoton emission in cps. BL=baseline; F=forehead; RP=right palm; LP=left palm; H=heart; VF=forehead during VELO; RPT=right palm transmitting energy during VELO; LPT=left palm transmitting energy during VELO; VH=heart during VELO.

Figure 11 shows the calculated biophoton emissions for Subject 5 from the various bodily regions, initially and in VELO. Although Subject 5 did not intend to change his heart emission, it increased 282%, which may be a unique characteristic of the VELO state. Biophoton emission from the right hand palm, the dominant hand in energy healing, increased by 23% when the subject intended to transmit energy, whereas the left hand palm emission did not change significantly.

	Initial	VELO	% Change
Forehead	12.5	11.7	-6%
Right Palm	25.5	31.4	23%
Left Palm	31.7	30.5	-4%
Heart	9.8	37.4	282%

Figure 11. Biophoton emissions (cps) from Subject 5, initially and in the VELO state. VELO increased heart emission 282% and right hand palm emission, with volition to transmit energy, by 23%.

These initial experiments with two subjects in extraordinary mind-body states are exploratory and limited in scope. Nonetheless, they demonstrate that various mind-body states can be cultivated that mobilize biophoton emission from specific regions of the body in unique patterns and in alignment with intention.

CONCLUSIONS

In three pilot studies, we found that biophoton emission (1) diminished significantly from healers' hands post-energy healing, and in particular, from the dominant right hand used to send energy; (2) showed unique temporal patterns during some, but not all, energy healing sessions conducted in the dark chamber; (3) exhibited no clear pattern or trend when measured from the head and trunk pre-post energy healing for a small number of diverse patients; (4) was altered in specific ways in extraordinary mind-body states showing correlations with intention to produce more biophotons. Our samples were not large enough for a meaningful statistical analysis. Larger studies are needed to confirm and extend these findings.

Nonetheless, these studies contribute scientific validation that conscious intention can apparently drive bioenergetic changes. Consider the principle of Oriental philosophy, "Where mind goes, *qi* (energy) flows." Easterners practiced meditational self-cultivation toward achieving mind-body oneness and mastered the *qi* along their path. Biophotons may be a manifestation of the *qi*, an intermediary system between mind and body. These results point to consciousness as a prime mover of the energy flows of life.

We plan to measure biophoton emission on the bodies of healers and patients during the energy healing session itself using two PMTs. By this means, we could make coincidence measurements of the biophoton emission from healer and patient, to look for coherence, which would involve investigating temporal photon count correlations. This might reveal important information about the therapeutic partnership in terms of quantum (or quantum-like) entanglement.

The source of biophoton emission and its relationship to the living state remain unclear. Nor has it been possible to decipher the information that biophotons may hold. The energy of some biophoton quanta is sufficient to cause ionization, a significant atomic-scale event. Given that naturally occurring radioactive potassium-40, a beta emitter, is a component of all organisms, certain ionizing radiation might even be supportive of life. If so, then the measurement of biophoton radiation might offer a unique window into an aspect of life largely ignored by conventional biology. In any case, eventually this enigmatic bodily radiation will be deciphered, and another

mystery of life will be solved.

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REFERENCES

- [1] Van Wijk R, Van Wijk EPA. An introduction to human biophoton emission (Review). *Forschende Komplementärmedizin Klassische Naturheilkunde* 12 (2005): 77-83.
- [2] Rubik , B. The biofield hypothesis: its biophysical basis and role in medicine. *Journal of Alternative and Complementary Medicine* 8(6) (2002): 703-717.
- [3] Rubik B. The biofield: bridge between mind and body. *Cosmos and History: Journal of Natural and Social Philosophy* 11(2) (2015): 83-95.
- [4] Rubik B, Muesham D, Hammerschlag R, Jain S. (2015). Biofield science and healing: history, terminology, and concepts. *Global Advances in Health and Medicine* 4(Suppl.) (2015): 8-14.
- [5] Hammerschlag R, Levin M, McCraty R, Bat N, Ives JA, Lutgendorf SK, Oschman J. Biofield physiology: a framework for an emerging discipline. *Global Advances in Health and Medicine* 4(Suppl.) (2015): 35-41.
- [6] Gurvich A G : *Die mitogenetische strahlung, ihre physikalische-chemischen grundlagen und ihre anwendung in biologie und medizine*. Jena, Germany: Verlag G Fisher, 1959.
- [7] Kaznacheev SP, Shurin SP, Mikhailova LP, Ignatovich NV. Distant intercellular interactions in a system of two tissue cultures. *Chemistry* 46 (1973): 17-22.
- [8] Brouder C, Cifra M. Coherence and statistic properties of ultra-weak photon emission. Chapter 9 in Fels D, Cifra M, Scholkmann F (editors). *Fields of the*

- Cell. Kerala, India: Research Signpost (2015): 163-188.
- [9] Cifra M, Brouder C, Nervudova M, Kurcera O. Biophotons, coherence, and photocount statistics: a critical review. *Journal of Luminescence* 164 (2015): 38-51.
- [10] Voeikov VL. Processes involving reactive oxygen species are the major source of structured energy for organismal biophotonic field pumping. In: Belousov L, Popp FA, Voeikov VL, and van Wijk R (editors). *Biophotonics and Coherent Systems. Proceedings of the 2nd Alexander Gurwitsch Conference*. Moscow: Moscow University Press (2000): 203-228.
- [11] Popp FA, Chang JJ, Herzog A, Yan Z, Yan Y. Evidence of non-classical (squeezed) light in biological systems. *Physics Letters A* 293 (2002): 98-102.
- [12] Popp FA, Shen X. The photon count statistic on the photon emission from biological systems using a new coincidence counting system. In: Chang JJ, Fisch J, Popp FA, *Biophotons*. Dordrecht: Springer Science+Business Media (1998): 87-92. [13] Van Wijk R, Kobayashi M, Van Wijk EPA. Anatomic characterization of human ultra-weak photon emission with a moveable photomultiplier and CCD imaging. *Journal of Photochemistry and Photobiology B: Biology* 83 (2006): 69-76.
- [14] Van Wijk EPA, Koch H, Bosman S, and Van Wijk R. Anatomic characterization of human ultra-weak photon emission in practitioners of Transcendental Meditation and control subjects. *Journal of Alternative and Complementary Medicine* 12(1) (2006): 31-38.
- [15] Usa M. Physiological state of biophoton emission of living body. In: Inaba H (editor), *Final Report on Inaba Biophoton Project Research Development Corporation, Japan* (1991): 239-277. (In Japanese)
- [16] Jung HH, Yang JM, Woo WM, Choi C, Yang JS, Soh KS. Year-long biophoton measurements: normalized frequency count analysis and seasonal dependency. *Journal of Photochemistry and Photobiology B: Biology* 78 (2005): 149-154.
- [17] Jung H. Left-right asymmetry of biophoton emission from hemiparesis patients. *Indian Journal of Experimental Biology* 41(5) (2003): 452.
- [18] Inaba H. Measurement of ultra-weak biophotonic information. *Proceedings of the Institute of Electrostatics Japan* 22 (1998): 245.
- [19] Joines WT, Baumann SB, Kruth JG. Electromagnetic emission from humans during focused intent. *Journal of Parapsychology* 76(2) (2012): 275-294.
- [20] Vekaria M. Biophoton emission and intentionality. Ph.D. Dissertation. California Institute for Human Science, Encinitas, CA (2003).

-
- [21] Van Wijk R, Bosman S, Ackerman J. Correlation between fluctuations in human ultra-weak photon emission and EEG alpha rhythm. *NeuroQuantology* 6(4) (2008): 452-463.
- [22] Joines WT, Baumann SB, Kruth JG. Electromagnetic emission from humans during focused intent. *Journal of Parapsychology* 76(2) (2012): 275-294.
- [23] Nakamura H, Kokubo H, Parkhomtchouk DV, Chen W, Tanaka M, Zhang T, Kokado T, Yamamoto M, Fukuda N. Biophoton and temperature changes of human hand during qigong. *Journal of International Society of Life Information Science* 18 (2000): 418-422.
- [24] Caswell JM, Dotta BT, Persinger MA. Cerebral biophoton emission as a potential factor in non-local human-machine interaction. *NeuroQuantology* 12(1) (2014): 1-11.
- [25] Reddy JSK. Could biophoton emission be the reason for mechanical malfunctioning at the moment of death? *NeuroQuantology* 14(4) (2016): 806-809.
- [26] Trivellato N. Measurable attributes of the vibrational state technique. *Journal of Conscientiology* 11(42) 2008: 165-203.