

ELECTROMAGNETIC EMISSION FROM HUMANS DURING FOCUSED INTENT

BY WILLIAM T. JOINES, STEPHEN B. BAUMANN (DECEASED), AND JOHN G. KRUTH

ABSTRACT: The Bioenergy Laboratory at the Rhine Research Center detects electromagnetic radiation from humans during times of focused intent—typically during deep meditation or implied energetic healing activities. Sensitive infrared (IR) and ultraviolet (UV) light detection equipment measures invisible light emissions from the participants. Approximately 100 participants, including self-proclaimed energetic healers, meditators, and others claiming no special abilities, were measured using IR and UV equipment. These experiments measure the levels (photons/second) of electromagnetic radiation and whether the participants are able to intentionally control the emissions. In the IR studies, professed energetic healers produced radiation or heat on their palms and foreheads when they began their healing process, and it subsided when they stopped. UV studies found 4 individuals and 3 meditation groups that intentionally projected from 3 to 100,000 times the baseline UV light readings in the room. The change began with their purposeful activities and stopped when the activity subsided. This research demonstrates that light-sensitive equipment can detect energies from some healers and meditators who are able to intentionally project this energy. These emissions may be related to chi, energetic healing, ESP activities, or PK.

Keywords: biophotons, chi, energy, healing, intention, ultraviolet light

The Bioenergy Laboratory at the Rhine Research Center is designed to detect electromagnetic radiation from humans during times of focused intent—typically during periods of deep meditation or implied energetic healing activities. All living organisms emit infrared (IR) electromagnetic radiation in the form of heat, and this radiation is just beyond the visible range of light (at longer wavelengths or lower frequencies). A sensitive infrared light detector in the Bioenergy Laboratory is used to record IR emissions that are not typically visible to the human eye. In addition, the Bioenergy Laboratory measures higher frequency (shorter wavelength) ultraviolet (UV) light emissions using a photomultiplier tube (PMT) detector that exceeds the sensitivity of the human eye within the UV and low-end visible light range. The IR and UV detection equipment in the laboratory enables the recording of electromagnetic radiation from humans that is out of the visible range of the human eye.

Over a multiyear period, approximately 100 different participants have been measured in a double darkroom using the IR and UV detection equipment. These participants have included experienced meditators (those claiming to meditate regularly for over 1 year), self-proclaimed energetic healers (some with a substantial reputation as a healer), and other participants who claim no special skills or abilities. The purpose of these experiments is to determine the intensity levels (photons/second) of

human emission of electromagnetic radiation that can be measured using the IR and UV equipment and whether any of the study participants are able to control the emissions of electromagnetic radiation through the use of intention.

Previous Support for Biophoton Emissions and Intentional Influence

Numerous studies indicate that attentive humans can mentally influence living systems. The range of systems affected runs the gamut from groups of cells (e.g., Baumann, Lagle, & Roll, 1986; Nash, 1982) to whole animals (e.g., Grad, 1965; Watkins & Watkins, 1971) to human subjects (e.g., Braud & Schlitz, 1991). Several recent reviews have been published (e.g., Schlitz & Braud, 1997; Targ, 1997), including perhaps the largest and best compendium of the entire literature (Benor, 2001). Benor has noted that in 131 controlled studies of distant mental intention, 56 found significant effects. Furthermore, a systematic review of randomized clinical trials found that 57% (13 of 23 that met the inclusion criteria) involving 2,774 patients showed a positive treatment effect (Astin, Harkness, & Ernst, 2000). The mechanism of action for distant mental intention is unknown.

It is well established in electromagnetic theory that rapid movements of charge can become a source of electromagnetic radiation (Plonus, 1978). In fact this is the basis of antenna theory and the radiation of radio and television signals. Less well known is the fact that the emission of electromagnetic energy in the form of low-intensity light from biological systems is a common phenomenon. European scientists have studied low-level emission of photons from organisms for quite some time (for reviews see Gu & Popp, 1992; Kochel, 1992; Popp, 2002; Slawinski et al., 1992; Tilbury, 1992; van Wijk, 1992, 2001). Called biophoton emission or ultraweak luminescence, the emissions are associated with all fundamental biological processes such as cell division, stress, and death. In nonbioluminescent organisms, the sources in the visible region are singlet oxygen and excited triplet state carbonyls. The wavelength ranges from 180–1500 nm and is thus in the infrared, visible, and ultraviolet regions of the spectrum. Low fluxes of less than 10–15 milliwatts per square centimeter are typical.

Biophoton Emissions and UV Light

The first reports of biophoton emissions were published 80 years ago by a Russian scientist (A. G. Gurwitsch, 1922, 1923; A. G. Gurwitsch & L. Gurwitsch, 1925), who reported that when onion root tips were exposed to other onion root tips, they grew faster. Specifically, the rate of mitosis, or cell division, increased. A. G. Gurwitsch also stated that this was a result of ultraviolet light emitted from the growing cells, which he named mitogenetic radiation (A. G. Gurwitsch et al., 1965; Metcalf & Quickenden, 1967). Of particular importance to our work are reports that human tissues radiate

in the ultraviolet region of the spectrum (Konev, Lyskova, & Nissenbaum, 1966; Rahn, 1936).

Research on biophoton emission in the United States (US) has been hampered by a study conducted in 1937. In this report to the National Research Council, Hollaender and Claus (1937) claimed to have found no evidence of mitogenetic radiation, and this curtailed well-funded investigations of the phenomena in the US. There are a number of reasons why Hollaender and Claus could not detect the radiation. At that time, radiation detectors were much less sensitive than the ones available today. Radiation detection often relied upon the response of other biological samples, such as the change in growth rate of control samples. Hollaender and Claus used the Geiger-Müller tube (a form of the Geiger counter) as a detector. The Geiger-Müller tube is most sensitive to photons at wavelengths shorter than 200 nm, and its detection sensitivity drops to near zero at 270 nm. But most mitogenetic radiation is thought to occur within the 250 to 400 nm wavelength range, just adjacent to the visible spectrum. Hollaender and Claus also averaged their data over a period of several hours. With their measurement technique, if certain low-level and short-duration radiation had occurred, it is doubtful they could have detected it.

Communication via UV Light

Studies conducted by a group of Russian scientists (Kaznacheev, Shurin, Mikhailova, & Ignatovich, 1973; Konev, 1959; Konev et al., 1966) show that damage or illness in one cell culture appears to be communicated via ultraviolet light to a neighboring cell culture. The ultraviolet light was assumed to be the carrier of a message from one cell culture to another, but no additional information was given on how such a message might have been encrypted onto the ultraviolet carrier wave. If such communication of illness between cells does occur by ultraviolet light, then the implication is that much larger organisms, such as humans, may have the ability to emit encrypted, or modulated, ultraviolet light during healing intent. Such UV light emission by humans may be the basis for observations of luminous phenomena around humans, as reported by Alvarado (1987).

All information transmitted by electromagnetic waves, including light waves, is through some form of modulation of the electromagnetic carrier wave. If the carrier wave *frequency* is varied in proportion to the information transmitted, it is frequency modulation (FM). If the carrier wave *amplitude* is varied in proportion to the information sent, it is amplitude modulation (AM). And if the power *intensity* of an optical carrier wave is altered in proportion to the information sent, it is intensity modulation. The bandwidth of the modulation, which is directly proportional to the information content, is typically less than or equal to 10% of the carrier wave frequency. Thus, modulated optical waves can carry enormous amounts of information. For example, a tiny 0.0001% bandwidth modulation at the

ultraviolet frequency of 800 THz (T = trillion or tera) contains 800 MHz of signal information. This represents all of the information that could be transmitted simultaneously on 160 television channels.

It is also well established that light is generated from a light emitting diode (LED) by injecting charges into the junction layer between dissimilar materials (the p-type and n-type regions), causing charges to transition to lower energy and emit light. The emitted light acts as a carrier of information when the information signal dims and brightens the emitted light in a manner known as intensity modulation (Jones, 1988). A model similar to the LED example could conceivably be applied to the skin of a human meditator with healing intent, and this will be discussed later in this article.

Preliminary Experiments on Cellular Radiation

In preliminary experiments on cellular radiation completed in the Bioenergy Laboratory, simple bacteria in petri dishes were used in order to measure any radiation that might occur. The early work then measured the existence of radiation from a number of other substances reported to yield mitogenetic (i.e., biophoton) radiation, such as red blood cells.

The studies began with three basic types of bacteria: *Bacillus subtilus*, *Escherichia coli*, and *Staphylococcus epidermidis*. At first, dilute acids, bases, and oxidants were used to disturb cultures suspended in tryptone broth solution as a buffer. All experiments were conducted in a dark environment. We found that light in the visible region of the spectrum above 580 nm and in the near ultraviolet was emitted and detected by the sensitive photon-counting instruments based on a cooled photomultiplier tube (PMT). The radiated light was of sufficient intensity that, once observers were dark adapted, the light was visible to the naked eye. The light appeared to come from the proteins of the bacteria but not from the amino acids, because when trypsin was applied to pure protein, radiation was detected from the entire sample. Since trypsin breaks a specific bond that holds the constituent amino acids together to form the proteins, this radiation might well occur during the digestion of proteins by all animals. Radiation from as few as four bacteria per ml of solution could be detected by the PMT system. Interestingly, the radiation could be elicited from the bacteria only during the late log phase of their growth, that is, just prior to death.

A number of experiments were done using red blood cells taken from the bodies of the researchers and placed in a petri dish. Adding a few drops of water to the red blood cells caused the cell membranes to rupture after a fairly consistent time delay of about 4 min. Any time the cell membrane was broken, emitted radiation in the visible-ultraviolet range was detected by the PMT in the dark environment. This is a very robust result, which was repeated many times. Rupturing the cell membrane

would be expected to cause a rush of ionic charge across the membrane. This movement of charge might well be the source of the radiation that we consistently measured.

Testing of tissue cells from hamsters and monkeys also yielded significant results. Indeed, healthy cells radiated, even spontaneously, but cancerous cells did not, similar to a previous report (Zakarayan & Tarusov, 1966). The cells could also be caused to radiate without the influence of chemical agents. Merely tapping a dish of bacteria or tissue cells caused them to emit both visible and ultraviolet light, enough to be visible at times to the dark-adapted eye.

The cellular radiation levels detected by the cooled PMT system were less than Hollaender and Claus (1937) could have measured, and the radiation occurred only in short bursts of less than 30 s duration when the cells were chemically or physically disturbed. Also the wavelengths of the radiation lie in a region not covered during the Hollaender and Claus experimentation. Spontaneously occurring radiation was found to be far less intense than that produced intentionally.

The intensity of the light detected in these preliminary experiments is relatively weak when compared with familiar light sources, but modern instruments can easily detect it in a darkened room. This may prove to be a source of radiation that is emitted from humans during periods of focused meditation by healers, and this radiation may become enhanced and modulated with information due to the intent and purpose of the meditation. Natural metabolic processes occurring in the human body may be producing radiation too weak to be detected by the eye but still detectable by particular cells in another person's body. If, in fact, cells do communicate by radiated light, this radiation would be a prime candidate for studying the mechanism of healing. If different organisms radiate at different wavelengths, or otherwise have a distinguishing radiation pattern, then the evolutionary process may well have adapted these distinctions as a means of communication.

Method

Bioenergy Lab Overview

A double darkroom was constructed to host the experiments to measure electromagnetic emissions from humans. This darkroom consists of two light-shielded rooms to prevent incidental leakage of light that might affect the IR and UV detection devices. An interior room is painted completely black with nonreflective paint, and all light sources and reflective surfaces are removed from the room. In addition, all sources of heat or other electromagnetic energies are removed from the room. The inner room houses the IR and UV detection equipment, which is cooled to near negative 23° Celsius to prevent any inadvertent interference with

the IR and UV detection devices. A second room separates the inner room from external light sources (windows or other laboratory light sources). The second room is sealed to prevent external light sources from entering, and all lights are turned off in the external room to complete the double darkroom environment necessary to reduce the influence of any external light sources on the equipment in the internal darkroom.

Within the internal darkroom is a sensitive thermographic infrared-visible camera (Thermal Techniques model 3300, argon cooled) that is used to record IR and visible radiation from participants in the darkroom. The IR camera has a digital output port used to communicate to a computer in the external darkroom. Through this electronic imaging, IR light emissions can be recorded and viewed by researchers in the external darkroom. In addition, the activity of the participants in the darkroom can be recorded to provide extra security and avoid the introduction of any artificial heat or light sources.

Also within the internal darkroom is the photomultiplier tube (PMT) used for UV detection. This PMT (type 56 DVP) with PMT housing (Pacific Photometric Instruments model 62/2F—thermoelectrically cooled to near -23° C) is able to measure two photons per s in the 400 to 200 nm wavelength range. Signals from the PMT are amplified by a Pacific Photometric 3A14 amplifier, and photons are counted by a photon counter (Thorn EMI GenCom model C-10) every half second. This information is transferred to a computer in the external darkroom and the number of photons detected is recorded every half second for the duration of an experimental session.

Purpose

The purpose of this experiment was to determine whether the equipment in the Bioenergy Lab can detect electromagnetic emissions from humans and to determine whether experienced meditators, self-professed energy healers, and other study participants can control the electromagnetic emissions during a study session—that is, are study participants able to increase IR and UV light emissions through the use of focused intention, and are they able to do it purposely and on command?

Population

The population for this study included the general population of humans, but specifically, this study was weighted toward those who are experienced meditators or have reported themselves as energetic healers.

Sampling

The sample used in this study consisted of approximately 100 participants that were recruited over a multiyear period. Some participants

were recruited specifically due to their experience with meditation (reporting at least 1 year of consistent meditation practice) or their reputation or self-declaration as energetic healers. Other participants included staff of the Rhine Research Center, students, and other participants who claim no special abilities or skills. Among the subjects tested in the darkroom, 5 were martial arts practitioners, and approximately 55 were classified as healers who felt that they emitted healing energy. Thus, approximately 40 subjects served as controls.

Typically, self-sampling can produce problems in research due to a lack of variation in the sample to represent the target population. This study involved an evaluation of the equipment to determine whether it could reliably detect any electromagnetic variances from the participants in the study. In addition, this study was designed to see if any individuals are able to influence the quantity of electromagnetic radiation through the use of intention. Although the target population includes all humans, the goals of this study can be evaluated within the context of a self-sampled group. If any electromagnetic variances are detected, the equipment can reliably be evaluated, and if any participant is able to vary the quantity of electromagnetic radiation through the use of intention, the second goal of the experiment—determining if any individual can influence the energy in the room—can reliably be determined. As such, these problems typically related to self-sampling can be dismissed for this study.

Basic Methodology

This study consisted of two distinct components that were tested separately and at different times. The first was the measurement of IR light emissions from reported energy healers and meditators. The second component was the measurement of UV light emissions from meditators, reported healers, and other participants. The IR light emissions were never tested at the same time as the UV light emissions as one set of detection equipment may have an effect on the other set of equipment.

All experiments were performed in the inner darkroom of the double darkroom. The light-detection equipment was cooled to prevent incidental influence from the heat of the devices, and the double darkroom was sealed to prevent external light sources from affecting the experiments. Participants were asked to remove any metal, glass, or other reflective materials (including eyeglasses, watches, and jewelry) before entering the inner lab.

Sessions lasted from 15 min to 45 min depending on the results that were being obtained and depending on the ability of the study participant to tolerate the pitch-black environment of the double darkroom. The participants would sit or stand in the internal darkroom near the detection equipment, and they were briefed on the experimental protocol and their part in the experiment.

The experimenter would insure that the participant was comfortable and then leave the internal darkroom. The door would be closed to both the internal and external rooms, and all lights would be turned off. At this point, a baseline reading would be taken in the room with the participant instructed to sit quietly without any intention to influence the detection equipment, meditate, or perform any healing activities. After a baseline was taken for approximately 1 to 3 min, the active portion of the experiment would begin when the participant would be instructed to begin his or her meditation or healing activities. The duration of the active portion of the experiment would vary based on the tolerance of the participant or the results being obtained. The active session would typically last between 10–30 min. In some cases, the active session would involve requests from the researcher to stop activities and restart them after a brief pause. Finally, the participant would be asked to stop his or her activities and a final baseline would be taken before the session would be ended.

Infrared Light Measurements

Infrared light measurements involved the measurement of heat and heat sources in the dark room. The experimenter in the external darkroom could view an image of the participant during the session and record any variations in the IR light in the room. The IR detection equipment includes the ability to record both the intensity of the IR light in the room and the location of the IR light within the room. These images were recorded by the experimenters using video recording equipment.

Ultraviolet Light Measurements

The UV light detection was done using the photomultiplier tube (PMT), which is sensitive to electromagnetic energy from 200–400 nm. The PMT used in the Bioenergy Lab is able to measure individual photons in this range every half second. This portion of the experiment only involved the measurement of a quantity of photons in the room and the variation from the baseline measurements. The PMT cannot detect the exact location of the UV light within the room or the specific wavelength of the light. The researcher is able to see and record the readings from the PMT on a computer in the external darkroom. These readings consist of a count of photons detected every half second and are recorded in both a database on the computer and within a graphical representation of the session, with each reading being represented in a bar graph of the session.

The Control Group

Although each participant in the study participated in the gathering of baseline data in his or her respective session, there were more than

20 individuals in the study who specifically acted as control participants, and control participants continue to be introduced to the study as more participants are included in the study. The control participants are asked to shuffle their feet, rub their clothing, and wave their arms about to check for artifacts. Then they are asked to sit calmly in front of the PMT to establish a baseline count. With no one in the darkroom the baseline count was approximately 5 photons per s or less, and the count rose to 8 to 16 photons per s with a human control participant in the darkroom. No movements or activities from the control group had a measurable effect on the UV measurements taken during the sessions, and though variations in body temperature were detected during control activities, no unexpected measurements were detected during the IR sessions with control participants.

Data Collection

The data for the IR measurements of this study consist of images of the participants which were generated by the IR detection equipment. These images were observed by the researchers and recorded on video tape.

The data for the UV measurements were recorded in a database that includes the number of photons detected for each half second of the session. These data were preserved on the research computer in the outer darkroom. In addition, notes were made to indicate when the researcher asked the participant to begin the active portion of the session, when to pause within the active session, and when to stop the active session to enable the gathering of the initial baseline readings and the closing baseline readings for the session.

Data Analysis Methods

The IR sessions involved the collection of images for the session. These images were analyzed visually by the researchers to determine if there was a variation in the IR readings and where the IR variations occurred. No external evaluation of these images was completed.

Although the data from the UV sessions could undergo a variance analysis to determine the statistical significance of the variation of the UV readings from the baseline readings taken at the beginning and end of the sessions, this detailed analysis proved to be unnecessary. The variations demonstrated by some individuals were visually apparent and required no detailed examination to recognize that there was a significant variation from the baseline readings. Variations in the magnitude of 500% to 100,000% were recorded for four individuals and three meditation groups, which made a detailed statistical analysis unnecessary. For more details, see the Results section.

Reporting

This research was completed over a multiyear period that included the tragic death of one of the primary researchers, Stephen Baumann. Due to his unexpected death, the publication and release of results of these experiments have been delayed. The data from these experiments are preserved, and we (William Joines and John Kruth) are continuing the work. This article is a preliminary presentation of the results of this study to enable further research. More detailed data and analysis will be reported in future publications.

Results

Infrared Experimental Results

The monitoring of participants with the IR camera included 19 alternative energy practitioners engaged in focused meditation. Of these, 15 were experienced therapeutic-touch (TT) healers and 4 were martial arts practitioners. Of the 15 TT healers, at least 12 showed increased IR emission on their palms and foreheads. The 4 non-TT practitioners were moving around in such a way that their palms and foreheads were not always visible to the IR monitor. Thus, IR data on these 4 were not recorded. This change would generally be invisible to the unaided human eye, but was clearly detected by the IR detection equipment. These results became so common among healers that the testing of healers with the IR detection equipment was suspended in order to complete more detailed testing using the UV detection equipment.

An increase in IR light is an indicator of an increase in heat, so these results indicate that the healers were increasing the heat output in their palms and forehead. This could be the result of an increase of blood flow or some other biological mechanism. These results were of interest to the researchers because the healers were able to initiate this change in heat on demand through a focused intention.

Ultraviolet Experimental Results

The results of the UV emissions experiment were based on a comparison between the baseline UV emissions detected in the room and the change in the emissions when the participant was asked to begin the active portion of the session. In addition, comparisons were made between activities during the active sessions when participants were asked to pause in their activities for a period of time and then resume them.

When the baseline readings within the inner darkroom are taken without any participants in the room, the PMT reads approximately 0–5 photons per second. When a human participant is in the room, the baseline

risers to approximately 8–16 photons per second. Though these values varied for some participants (certain individuals demonstrated a baseline value of up to 40 photons per second), these baseline numbers are consistent across nearly every participant in the study (see Figures 1 and 2).

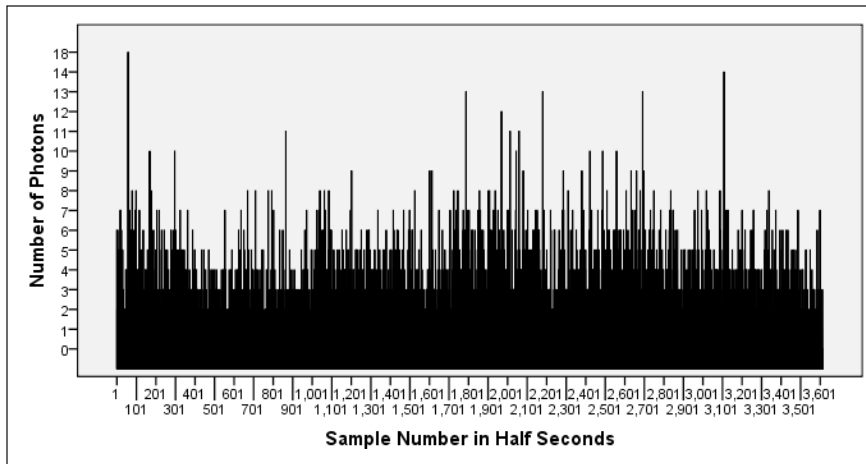


Figure 1. Normal control session. This session is an example of a normal control session with a baseline value of approximately 8–16 photons per s. No readings exceed 20 photons in this session.

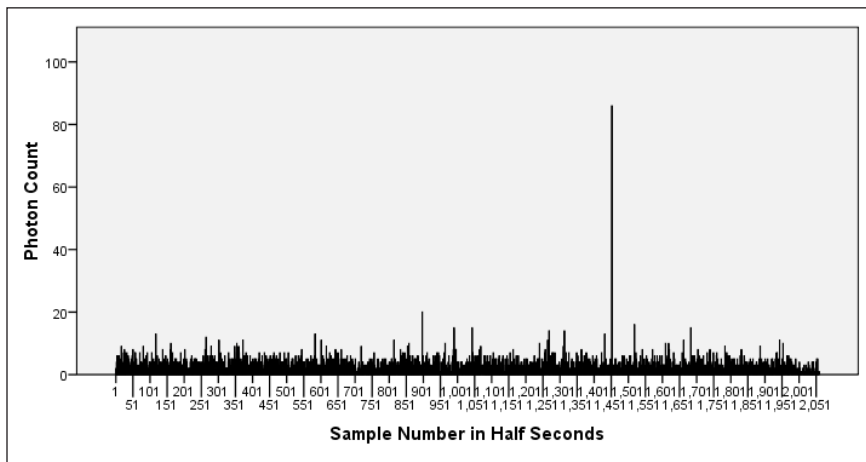


Figure 2. Session with a single spike. This session contains a single spike of approximately 80 photons, which is more than 5 times the baseline value of less than 15 photons.

Meditation Groups

The meditation groups consisted of three participants in the darkroom doing healing meditations (so far, three different groups of

three). When the participants were instructed to start meditating, the photon count typically rose to approximately 40 to 60 photons per s (~15 min in duration). When the participants were instructed to stop meditating, the count consistently dropped back to the baseline of approximately 10 photons per s. Although in these tests the photon count is relatively low, the change in light level due to a change in mindset is from 400%—600% above the baseline of 10 photons per s.

Two Exceptional Participants

On multiple occasions, two individual participants (KG and AA) were able to generate between 400,000 and 800,000 photons per s for a period of several seconds. These results were repeated by each of these participants on different occasions, indicating the ability to repeatedly produce between a 40,000% and 80,000% increase in electromagnetic energy within the room (see Figure 3).

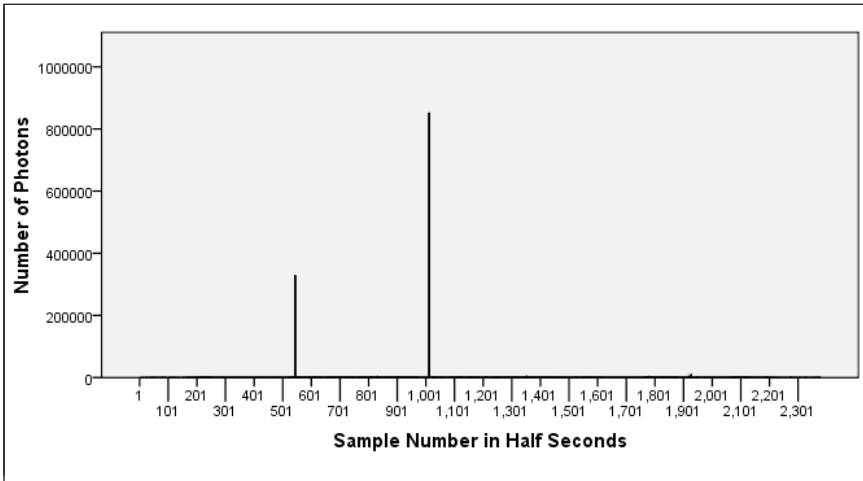


Figure 3. Session with a spike over 850,000 photons. This session contains multiple spikes with a high value over 850,000 photons. The baseline of approximately 16 photons is not visible on this scale, and smaller spikes of about 500–2,000 photons are also not visible on this scale.

Repeated successes. One participant (KG) was able to demonstrate counts between 400,000 and 800,000 photons per s after a brief period of meditation. KG was able to repeat these results in 30 different sessions. In one session, KG was able to generate enough light to become visible to a research assistant seated in the darkroom during the session.

Learning to improve. A recent participant (EE) was involved in eight separate sessions over a period of approximately nine months. Within

that period, EE demonstrated the ability to produce between 100 photons per s to over 1,600,000 photons per s. EE's performance improved with a better understanding of how the equipment functions and with consistent feedback on performance during the experiments.

In addition to improving in the quantity of photons produced in these experiments, EE expressed a desire to increase the amount of time that the increase in emissions is detectable. While initially the changes in the photon count in the darkroom would last approximately 1–2 s, more recent sessions have seen the photon count increase for a period of approximately 4–6 s with a variation in intensity from 40,000% to 100,000% above the baseline readings. This change in results based on a specifically expressed intention of the participant demonstrates that learning is occurring and that the results can be affected by the intention of the participant (see Table 1 and Figure 4).

Table 1
Increase in Learning for Participant EE

Date/Session	Maximum photons per second	Number of significant values ^a	Maximum durations (seconds) ^b
July 22, 2011			
Session 1	172	1	1
Session 2	272	6	1
November 4, 2011			
Session 1 (unusable data)	-	-	-
Session 2	3,282,398	41	11, 4, 3
Session 3 (unusable data)	-	-	-
Session 4	1,703,700	49	3, 2
February 3, 2012			
Session 1	2,046,612	68	17, 5, 4, 2
February 4, 2012			
Session 1	2,393,502	103	7, 7, 7, 6, 5, 4
Session 2	1,703,700	52	4
Session 3	2,068,812	62	17, 5, 4

^aSignificant values were determined by finding the mean and median and evaluating the number of values that are at least 3 times the highest baseline value and are above the mean and the median.

^bDuration was determined by locating significant values that occurred consecutively with less than a 3-s gap between them.

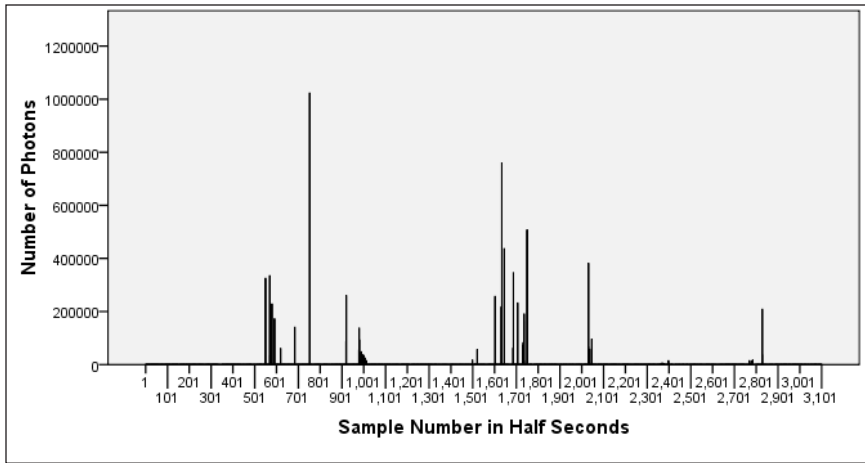


Figure 4. Session demonstrating grouping of spikes. The groupings of spikes in this session demonstrate the learned ability to maintain high levels of energy for a number of seconds. This study participant (EE) purposely attempted to learn this ability over a number of months of practice.

Discussion

Photons Are Energy

In standard physics, electromagnetic energy is measured in joules by multiplying Planck's constant times the frequency of the light being measured. At a wavelength of 385 nm, or 780 THz, corresponding to the peak sensitivity of the PMT detector, the energy of a single photon is still quite small but detectable by the PMT. Multiplying the energy per photon by 1,600,000 photons per s (the peak detected from a human subject) yields 0.83 pJoule per s, which equals 0.83 pWatt (1 pWatt is one trillionth of a watt). This is a sizable peak energy or power at this frequency. (Consider that satellite television delivers approximately 1 pWatt to earth at a frequency of 12 GHz for all of its audio and video information.) Since certain individuals are able to produce a measurable increase in photons through their focused intention, and since photons can be converted to measureable energy, these individuals are purposely producing an invisible energy that is measurable using very sensitive light-detection equipment.

There is no specific indication that the energy measured in the Bioenergy Laboratory is healing energy, chi, or a calming energy produced by meditation, but it is clear that some individuals are able to increase the energy detected within the Bioenergy Laboratory through focused intention. The results of participant EE also indicate that some people are able to learn to increase their energy output over time and to sustain the energy increase with a change in intention.

Problems With Protocol or Methodology

Recent discussions of this study have brought to light some possible flaws in the protocol that will need to be examined and controlled in the future. For example, it has become clear that certain foods will have a bioluminescent quality—especially certain shellfish (Sado, 1998). It is possible that the meals eaten by certain participants could increase the amount of UV light produced in the room. In addition, it is possible that a meal that was recently eaten could linger within the mouth of the participant, and that the variation in UV light could be affected by an action as simple as opening one's mouth. Future sessions will monitor the meals of the participants and avoid testing participants who may have consumed foods that might affect the results of the study.

In addition, the records of the activities requested by the researcher during the sessions have been kept on loose leaf paper within the lab, and the record keeping for activities during each session is not formalized or easy to interpret. Future work in this laboratory will require more formal record keeping of the activities requested by the researcher during the session, and a careful accounting of these activities.

Finally, the protocol used for analyzing the IR image results needs to be clearly defined and independently analyzed in order to validate the reported results of the study. Although the results are well recognized and understood by the researchers involved in the study, an independent review of the work would assist in the validation of the results without any possible bias from the researchers involved in the study.

Areas for Further Studies

The equipment used in the Bioenergy Laboratory is the most sensitive equipment available for detecting UV emissions, but the equipment can only measure a quantity of photons. It does not measure the specific wavelength of the photons being measured or give any indication of the source of the photons within the room. The result of this limitation is that this study is a proof-oriented study. Future studies in this area should focus on the process involved in generating this energy. Additional equipment that measures specific wavelengths of the light being produced and the location of the light within the room would provide additional data that would help researchers to examine the source of the energy and the specific type of energy that is being generated.

Other areas for future studies may involve monitoring the activities of the participants more closely to see which activities result in higher energy readings within the room and which activities seem to be extraneous or irrelevant. It is possible that certain activities are common among participants who successfully generate additional UV photons within the darkroom. If this is the case, a methodology for generating higher energy might become more apparent.

Conclusions

These studies indicate that certain humans are able to generate an invisible quantity of energy through the use of focused intention. This invisible energy can be detected as ultraviolet light using very sensitive equipment in a darkroom environment. Studies of healers and experienced meditators seem to indicate that this energy may be associated with the activities commonly practiced by certain meditators and energy healers.

Though there are some potential flaws in the protocol that was used in this study over a period of many years, the results are visible to the naked eye without the use of a detailed statistical analysis. Also, the variation from the baseline readings is so large that it is unlikely that simple manipulations of eating patterns could produce such results.

Given the evidence uncovered during this study, it appears that further research is warranted related to intentional ultraviolet light emissions from experienced meditators, martial artists, and those who report themselves as energetic healers. Future research should focus on the process involved in producing these energies that are being detected as ultraviolet light. The results of future studies could have a substantial impact on our understanding of the abilities and limitations of people in their potential to generate and possibly transfer energy from one person to another. Future studies may also help to provide insight into methods that can be used to measure invisible energies in real-world environments outside of a double darkroom in a laboratory.

A growth of research in this area may help scientists, biologists, and medical professionals to better identify the invisible forces that surround us and to better facilitate the generation and transfer of energies that may assist in the healing and comfort of people and other living things.

References

- Alvarado, C. S. (1987). Observations of luminous phenomena around the human body: A review. *Journal of the Society for Psychological Research*, 54, 38–60.
- Astin, J. A., Harkness, E., & Ernst, E. (2000). The efficacy of “distant healing”: A systematic review of randomized trials. *Annals of Internal Medicine*, 132, 903–910.
- Baumann, S., Lagle, J., & Roll, W. (1986). Preliminary results from the use of two novel detectors for psychokinesis [Abstract]. In D. H. Weiner & D. I. Radin (Eds.), *Research in parapsychology 1985* (pp. 59–62). Metuchen, NJ: Scarecrow Press.
- Benor, D. J. (2001). *Healing research: Spiritual healing: Scientific validation of a healing revolution* (Vol. 1). Southfield, MI: Vision Publications.
- Braud, W. G., & Schlitz, M. J. (1991). Consciousness interactions with remote biological systems: Anomalous intentionality effects. *Subtle Energies*, 2, 1–46.

- Grad, B. R. (1965). Some biological effects of laying-on of hands: A review of experiments with animals and plants. *Journal of the American Society for Psychical Research*, 59, 95–127.
- Gu, Q., & Popp, F.-A. (1992). Nonlinear response of biophoton emission to external perturbations. *Experientia*, 48, 1069–1081.
- Gurwitsch, A. G. (1922). Über Ursachen der Zellteilung [About the Causes of Cell Division]. *Archiv für Entwicklungsmechanik der Organismen*, 52, 167–177.
- Gurwitsch, A. G. (1923). Die natur des spezifischen Erregers der Zellteilung [The Nature of the Specific Pathogen Cell Division]. *Archiv für Entwicklungsmechanik der Organismen*, 100, 11–24.
- Gurwitsch, A. G., Eremeyev, V. F., & Kababchievsky, Y. A. (1965). Ultra-weak emissions in the visible and ultra-violet regions in oxidation solutions of glycine by hydrogen peroxide. *Nature*, 206, 20–22.
- Gurwitsch, A. G., & Gurwitsch, L. (1925). Über den Ursprung der mitogenetischen Strahlen [About the Origin of Mitogenic Rays]. *Archiv für Entwicklungsmechanik der Organismen*, 105, 470–482.
- Hollaender, A., & Claus, D. W. (1937). An experimental study of the problem of mitogenetic radiation. (Bulletin No. 100, pp. 1–96). Washington, DC: National Research Council.
- Jones, W. B. Jr. (1988). *Introduction to optical fiber communication systems*. Oxford, England: Oxford University Press.
- Kaznacheev, S. P., Shurin, S. P., Mikhailova, L. P., & Ignatovich, N. V. (1973). Distant intracellular interactions in a system of two tissue cultures. *Chemistry*, 46, 17–22.
- Kochel, B. (1992). Time-resolved luminescence of perturbed biosystems: Stochastic models and perturbation measures. *Experientia*, 48, 1059–1069.
- Konev, S. V. (1959). Fluorescent excitation spectra of proteins. *Bulletin of the Academy of Sciences of the USSR*, 23, 88–90.
- Konev, S. V., Lyskova, T. I., & Nisenbaum, G. D. (1966). Very weak bioluminescence of cells in the ultraviolet region of the spectrum and its biological role. *Biofizika*, 11, 410–413.
- Metcalf, W. S., & Quickenden, T. I. (1967). Mitogenetic radiation. *Nature*, 216, 169–170.
- Nash, C. B. (1982). Psychokinetic control of bacterial growth. *Journal of the Society for Psychical Research*, 51, 217–221.
- Plonus, M. A. (1978). *Applied electromagnetics*. New York: McGraw-Hill.
- Popp, F.-A. (2002). Biophotons—Background, experimental results, theoretical approach and applications. *Frontier Perspectives*, 11, 16–28.
- Rahn, O. (1936). *Invisible radiations of organisms*. Berlin: Verlag von Gebrüder Borntraeger.
- Sado, P. N. (1998). “Glowing” seafood. *California Journal of Environmental Health*, 21, 15–18.

- Schlitz, M., & Braud, W. (1997). Distant intentionality and healing: Assessing the evidence. *Alternative Therapies*, 3(6), 62–73.
- Slawinski, J., Ezzahir, A., Godlewski, M., Kwiecinska, T., Raifur, Z., Sitko, D., & Wierzuchowska, D. (1992). Stress-induced photon emission from perturbed organisms. *Experientia*, 48, 1041–1058.
- Targ, E. (1997). Evaluating distant healing: A research review. *Alternative Therapies*, 3(6), 74–78.
- Tilbury, R. N. (1992). The effect of stress factors on the spontaneous photon emission from microorganisms. *Experientia*, 48, 1030–1041.
- Van Wijk, R. (1992). Biophoton emission, stress and disease. *Experientia*, 48, 1029–1030.
- Van Wijk, R. (2001). Bio-photons and bio-communication. *Journal of Scientific Exploration*, 15, 183–197.
- Watkins, G. K., & Watkins, A. M. (1971). Possible PK influence on the resuscitation of anesthetized mice. *Journal of Parapsychology*, 35, 257–272.

Rhine Research Center
 Durham, NC, USA
 wtj@ee.duke.edu
 john.kruth@rhine.org

Acknowledgment

We acknowledge with gratitude the support of the Bial Foundation for this research.

Abstracts in Other Languages

German

ELECTROMAGNETISCHE EMISSION BEI MENSCHEN BEI FOKUSSierter ABSICHT

ZUSAMMENFASSUNG: Das Bioenergy Laboratory am Rhine Research Center misst die elektromagnetische Strahlung, die während Zeiten fokussierter Intention vom Menschen ausgeht – typischerweise während tiefer Meditation oder zusammen mit energetischen Heilungsaktivitäten. Ein empfindlicher infraroter (IR) und ultravioletter (UV) Photosensor misst die unsichtbare Lichtstrahlung der Teilnehmer. Ungefähr 100 Teilnehmer, die aus selbsternannten energetischen Heilern, Meditierenden und anderen Personen bestanden, mit keine besonderen Fähigkeiten für sich in Anspruch nahmen, wurden mit IR- und UV-Sensoren gemessen. Diese Experimente messen die Stärke (Photonen/Sekunde) der elektromagnetischen Strahlung und ob die Teilnehmer in der Lage sind, diese Emissionen willentlich zu kontrollieren. Bei den IR-Untersuchungen zeigte

sich, daß die selbsternannten energetischen Heiler Strahlung oder Wärme auf Handflächen und Stirn abgaben, wenn sie mit dem Heilungsprozess begannen, beides klang ab, wenn sie damit aufhörten. Bei UV-Untersuchungen zeigten sich 4 Personen und 3 Meditationsgruppen, die willentlich in der Lage waren, die Kontroll-UV-Licht-Messungen um das 3 bis 100,000fache in den Raum zu projizieren. Die Änderung setzte mit ihren willentlichen Aktivitäten ein und hörte auf, wenn die Aktivität nachließ. Die Forschung hat ergeben, dass eine lichtempfindliche Ausrüstung Energien bei einigen Heilern und Meditierenden nachweisen kann, die in der Lage sind, diese Energie willentlich auszustrahlen. Diese Ausstrahlungen könnten mit Chi, energetischem Heilen, ASW-Aktivitäten oder PK in Verbindung stehen.

Spanish

EMISIÓN ELECTROMAGNÉTICA DE HUMANOS DURANTE INTENCIÓN ENFOCADA

RESUMEN: El Laboratorio de Bioenergía del Rhine Research Center detecta la radiación electromagnética de los seres humanos durante momentos de intención enfocada, por lo general durante meditación profunda o actividades de sanación energética, con un aparato sensible de detección infrarroja (IR) y ultravioleta (UV). Medimos a aproximadamente 100 participantes, incluyendo presuntos sanadores energéticos, meditadores, y otros que no pretenden tener habilidades especiales, con el aparato para IR y UV. Estos experimentos midieron los niveles (fotones/segundo) de la radiación electromagnética y si los participantes eran capaces de controlar intencionalmente las emisiones. En los estudios de IR, los sanadores energéticos produjeron radiación o calor en las palmas y frente cuando iniciaron su proceso de curación, que disminuyó cuando terminaron. Los estudios con UV identificaron a 4 personas y 3 grupos de meditación que intencionalmente proyectaron de 3 a 100,000 veces el nivel de línea de base de luz UV en la habitación. El cambio comenzó con sus actividades intencionales y se detuvo cuando la actividad disminuyó. Esta investigación demuestra que aparatos sensibles para detectar luz pueden detectar las energías de algunos curanderos y meditadores que pueden proyectar intencionalmente esta energía. Estas emisiones pueden relacionarse con chi, curación energética, y actividades de PES o PK.

French

EMISSION ELECTROMAGNETIQUE D'HUMAINS DURANT UNE FOCALISATION DE L'INTENTION

RESUME: Le Laboratoire de Bio-énergie du Rhine Research Center détecte des radiations électromagnétiques en provenance d'humains durant des périodes de focalisation de l'intention – en particulier durant une méditation profonde ou des activités de guérison impliquant des énergies. Des équipements de détection de

la lumière sensibles aux infra-rouges (IR) et aux ultra-violets (UV) ont mesuré des émissions de lumière invisible en provenance des participants. Environ 100 participants, dont des guérisseurs énergétiques auto-proclamés, des méditants et d'autres personnes ne revendiquant aucune capacité spéciale, ont été mesurés au moyen de ces équipements. Ces expérimentations mesurent les niveaux (photons par seconde) de radiation électromagnétique et également si les participants sont capables de contrôler intentionnellement ces émissions. Dans les études sur l'IR, les guérisseurs énergétiques professionnels ont produit des radiations ou de la chaleur sur leurs paumes et leurs fronts pendant qu'ils débutaient le processus de guérison, et celles-ci ont disparu lorsqu'ils ont cessé. Les études d'UV ont trouvé quatre individus et trois groupes de méditation capables de projeter intentionnellement des UV dans la pièce entre 3 et 100 000 fois supérieurs à la ligne de base. Les changements commençaient lorsqu'ils débutaient les activités visées et s'arrêtaient lorsqu'ils les cessaient. Cette recherche démontre que des équipements sensibles à la lumière peuvent détecter des énergies chez certains guérisseurs et méditants capables de projeter intentionnellement cette énergie. Ces émissions peuvent être reliées au psi, aux énergies de guérison, aux processus d'ESP ou de PK.