

Healing practices like Qigong, Johrei, Reiki, and Therapeutic Touch are being actively studied to discover if there is a way to scientifically measure the efficacy of biofield therapies. Based on focused energy or mental intention, many of these biofield methods claim to combat disease. Dr. Garret Yount and his research team tested these claims in the following study, asking the question: Can biofield treatments like Qigong and Therapeutic Touch keep brain cells alive?

Evaluating Biofield Treatments in the Laboratory

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INTRODUCTION

Can biofield therapies, based on mental or spiritual interactions with patients at an energetic level, be studied in the laboratory in a manner similar to other biomedical interventions? Published scientific reports indicating that isolated cells growing in culture can register the effects of biofield treatments constitute some of the most objective evidence for the efficacy of these therapies. The far-reaching implications of this possibility inspired our research group at the California Pacific Medical Center to apply a stricter standard than is generally applied in

the field when approaching this topic.¹ Our approach was to include an equal number of independent experiments involving no healing intervention to measure the intrinsic variability in the experimental systems throughout the project. This report summarizes the results of the fifth² in a series of biofield studies conducted by our group incorporating such systematic negative controls.³ This study tested whether healing treatments by experienced biofield practitioners can protect human brain cells against oxidative stress.

Background

Healing involving the manipulation of some form of superphysical energy has been described and practiced throughout history in virtually every known culture.⁴ Many of these healing traditions involve rituals and practices in which a healer mediates the healing, placing their hands on or near the recipient. This form of healing has come to be termed biofield therapy and includes external Qigong, Johrei, Reiki, and Therapeutic Touch, among others. Practitioners of biofield therapies purport that during this healing relationship, the healer draws or channels superphysical energy and directs this *bioenergy* toward a biofield target. Some hypothesize that these interventions may work by impacting the global regulatory processes of life rather than the physical structures of the body.⁵ Others hypothesize that the strong interpersonal component inherent in biofield treatments may mediate the effects on patients, for example by triggering neural circuits promoting calm physiological states contributing to health.⁶ If there is scientific validity to these therapies, it is likely that more than one mechanism contributes to the overall healing process.

A small number of randomized, peer-reviewed clinical studies indicate that healing effects can be measured following biofield therapies but it is difficult to distinguish whether these effects

are due to energetic emissions or to activation of innate healing abilities (e.g., the power of suggestion). The majority of the clinical studies of biofield therapies that have been conducted involve Therapeutic Touch, a semiformalized process used by nurses and others.⁷ Fifty-eight percent of these studies showed a statistically significant result but the quality of these studies was judged poor to fair.⁸ A large body of Chinese literature on clinical studies of Qigong therapy exists, but again, the quality of these studies has been questioned.⁹

In vitro studies of biofield therapies involving cells growing in culture are able to be performed in tightly controlled environments, which minimize confounding variables such as the power of suggestion. More than one hundred *in vitro* studies are reported in the Chinese literature indicating a robust responsiveness of cultured cells to Qigong but these were judged as being of poor quality.⁸ The *in vitro* investigations reported in peer-reviewed journals show mixed results. Studies using cancer cells as the target of biofield treatments have shown both a growth inhibition¹⁰ and no effect.^{11, 12} Studies using normal cells as the target of biofield treatments have shown associated changes in intracellular calcium concentrations^{13, 14} and another study showed an influence on the growth of bacteria.¹⁵ Evaluating the balance of these and other *in vitro* studies is made difficult because, almost universally, reported effects of biofield therapies on cultured cells are small in magnitude and highly variable.

An *in vitro* study reported by investigators at the University of Oklahoma with co-authors from the University of Sherbrooke, Harvard Medical School, and the National Institutes of Health stands out in that it claims dramatic and reproducible effects.¹⁶ This group tested whether treatments by a well-known Qigong practitioner can protect rat brain cells from cell death induced by oxidative stress in the form of exposure to hydrogen peroxide

(H₂O₂). Their findings suggest that Qigong treatments can reproducibly block the damaging effects of H₂O₂ to such a degree that they outperform pharmaceutical compounds currently in use as protective agents against oxidative stress. Considering the general importance of oxidative stress as a causative factor in many human diseases,¹⁷ the need to determine the validity of these results in independent laboratories is urgent. Thus, we recruited a group of highly experienced and well-known biofield therapy practitioners to participate in a series of experiments treating cells exposed to H₂O₂. Importantly, all of the practitioners were agreeable to participation in studies at multiple institutions to enable future attempts to replicate the experiments reported here.

METHODS

Cell Culture

A large population of normal human astrocytes was divided into aliquots and frozen cryogenically for storage. Fresh aliquots were thawed at the start of each experiment and cultured within a Plexiglas incubation chamber attached to a computerized time-lapse microscope equipped with a heated stage. The chamber maintained optimum environmental conditions (37°C, 5 percent CO₂) by independent digital control units. Cells were seeded into four individual wells of a six-well plate at a density of 30,000 cells per well. H₂O₂ was added to independent cultures while still in the microscope incubation chamber at final concentrations of 600, 700, 800, and 900 μM.

Computerized Time-lapse Microscopy

Two sets of phase contrast images from each well were acquired at 300-second intervals. Every cell in the initial microscopic field was identified and numbered. All identified cells and their progeny were tracked as long as they remained within the

microscopic field. Cells that entered the microscopic field after the initial frame were not included, nor were cells identified as dead at the start of the experiment. Cell death was defined by morphological behaviors characteristic of programmed cell death including retraction of lamellipodia, rounding up, membrane blebbing, and loss of membrane integrity.¹⁸ Cell deaths were counted for varying numbers of cells over a 5-hour period, with counts being made every half hour.

Healing Intervention

Six highly experienced biofield practitioners participated; all were internationally revered within their respective disciplines and had more than seventeen years experience treating patients. This elite team included two Qigong practitioners, two Johrei practitioners, and two internationally known healers who have developed teachable methods of biofield therapy based on innate healing abilities. To avoid implicit endorsement, practitioners were compensated for their participation through honoraria and their identities and the details of the individual techniques remain confidential. Over a period of five months, practitioners visited the laboratory individually. Healing treatments were delivered by a single practitioner 15 minutes before the cells were exposed to H₂O₂ and then 15 minutes immediately following H₂O₂ exposure. The Plexiglas wall of the incubation chamber insured that the practitioners' hands remained at least 20 cm away from the cultures at all times. For control experiments, nobody entered the microscope room during the treatment period.

The nature of the target cells was discussed with each of the practitioners prior to initiating the experiments, including the possibility that healing treatments might hasten the death of cells injured by oxidative stress because of some innate need of the cells. In light of the many potential outcomes, it was made explicit that our

intention was to assess the ability of biofield treatments to protect the cells from H₂O₂-induced cell death. In general, the techniques employed by both Qigong practitioners involved first assessing the *Qi* of the cells through a specialized mode of perception. Secondly, the Qigong practitioners delivered external *Qi* toward the cells in accordance with the perceived needs of the cells. Lastly, the Qigong practitioners released any unhealthy *Qi* from the system. One of the two biofield healers followed procedures that were very similar to those of the Qigong practitioners, in that a form of bioenergy of the cells was first assessed and then affected by the emission of bioenergy from the healer. The approach of the Johrei practitioners was to channel divine light to the cells. Both of the Johrei practitioners followed a series of five mental procedures as follows: (1) establishing a connection to the divine, (2) consciously relaxing the body and mind, (3) visualizing healing energy traveling through the upraised hand and penetrating the cellular target, (4) taking enjoyment in participating in the experiment, (5) maintaining a feeling of gratitude. The technique of the second biofield healer resembled that of the Johrei practitioners because it involved a series of routine mental tasks that were not directly intended to produce healing. These mental tasks were practiced simultaneously with a physical technique intended to direct energy.

Blinding and Randomization

Experiments were conducted with blinding applied to each of the scientists based on previously reported methods.¹⁹ Briefly, the experimental protocol was divided among scientists such that those responsible for handling of the cell cultures, escorting the practitioners, and gathering the raw data were all blind to each other's activities until data analyses were complete. The blinding procedures insured that the scientists handling the cells and analyzing the data were not aware of whether the cells had received biofield treatments. The location of each culture

was randomly assigned to wells in the six-well plate using an online pseudo-random number generator so that each plate had equal likelihood of assignment to any incubator position. This allowed testing of whether placement in the incubator had any effect.

RESULTS

Time-lapse microscopy allowed us to observe the rate of cell death in cultures before and after treatment periods. A series of 48 independent experiments were conducted; half involved healing treatments by a biofield practitioner and half were separate control experiments involving no intervention during the treatment periods.

Each practitioner participated in four independent experiments over a two-day visit to the laboratory. Four control experiments were conducted in the days immediately following each practitioner visit. The cell cultures became contaminated during the visit by one practitioner, resulting in the eight experiments from this set (four control and four treated) being dropped from the analysis. In the remaining 40 experiments, a total of 3,755 cells were followed in control samples and 4,087 cells were followed in samples exposed to biofield treatments. The average number of cells observed in independent wells was 47 for control samples and 51 for treated samples.

We used a generalized linear model to determine whether the numbers of cell deaths over the five-hour observation period beginning at the start of treatment was significantly related to concentration of H_2O_2 , date of experiment (considered as an ordinal variable with value 1 for the first date and 5 for the last date), and treatment type (biofield treatment vs. control), adjusting for number of cells at the start (i.e., before treatment). The model stipulated a binomial distribution with logit link function. Examination of residuals (observed deaths minus

model-predicted deaths) revealed that, after fitting, observed counts were more variable than predicted by a binomial distribution. The analysis was repeated using deviance divided by residual degrees of freedom as a scaling parameter to adjust the standard errors for the model parameters and p-values for statistical significance. Testing was carried out hierarchically: first we tested for overall dose, date, and treatment type effects; then we tested for dose and treatment effects within each practitioner. Testing was carried out hierarchically to minimize false positives due to multiple testing, with tests at lower levels only being carried out after establishing that the higher-level factor was statistically significant.

No effect of biofield treatment was apparent when considering all of the experiments together as a whole. The dose response to increasing concentrations of H_2O_2 was clear and consistent, verifying that the target cells were in a dynamic, functional state that could be influenced by external stimuli. Initial analysis of cell deaths showed significant differences between H_2O_2 doses and between groups of experiments involving different practitioners, but no significant differences between control and treatment conditions. In post hoc analyses, the data were broken down by sets associated with individual practitioners and two were associated with only borderline significant reduction in cell death.

DISCUSSION

The lack of cellular responsiveness we observed in this study may be an indication that biofield therapies do not operate through the emission of an energy that can directly impact a person's body. Yet the possibility remains that cultured cells are not an appropriate target for biofield treatments because of their isolation from the human body. Biofield treatments might include an informational component that requires organized

cellular networks for detection, for example. Alternatively, biofield therapies might also require the presence of an *organized* biofield that could dissipate from cells kept alive after the donor is deceased. These and other reasons might explain the lack of cellular responsiveness to biofield treatments, but the results reported from the University of Oklahoma, using a similar model, suggest otherwise.¹⁶ Resolving this apparent discrepancy would help to direct future research in this area because the issue of whether or not purely mental or spiritual activities can directly impact a person's body is pivotal in the field.

The divergence of the results reported here with those reported from the University of Oklahoma may be due to one or more differences in the experimental protocols. One difference in the protocols is the use of different cell types. We used human glial cells and the Oklahoma group used rat neuronal cells. We used human glial cells in this study for two reasons: (1) human cells more closely approximate clinical treatment settings, and (2) glial cells proliferate indefinitely and thus would allow the use of cells with an identical genetic makeup in future replication attempts in independent laboratories. Although both neuronal and glial cells originate from the brain, further specialization in information processing may have better equipped the rat neuronal cells to sense signals sent by biofield practitioners.

Another unique aspect of the protocol followed in the study reported here is the inclusion of an equal number of control experiments without any involvement of biofield practitioners. These systematic negative controls provided a measure of intrinsic variability of the experimental system throughout the entire study. Indeed, results from a series of studies in our laboratory incorporating systematic negative controls are consistent with those reported here; all found no evidence that biofield treatments were associated with cellular responses outside what could be explained by experimental variability.²⁰⁻²³

The credentials of the practitioners in both the University of Oklahoma study and this study are exceptional, yet one individual performed all of the biofield treatments in the University of Oklahoma study. It is possible that this individual has unique abilities over and above those of even the most highly experienced biofield practitioners. Thus, we argue that a research priority in the field should be to assess the reproducibility of the experiments reported by the University of Oklahoma in independent laboratories with the same practitioner and students of that practitioner. We would also urge that future studies of biofield therapies include systematic negative controls to bolster the validity of outcomes.

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