International Journal of Transpersonal Studies

Volume 33 | Issue 1 Article 12

1-1-2014

# A Possible Mechanism of Action for the Placebo Response: Human Biofield Activation Via Therapeutic Ritual

Marie G. Brook
*Sofia University*

Randy Fauver
*JFK University*



## Recommended Citation

Brook, M. G., & Fauver, R. (2014). Brook, M. G., & Fauver, R. (2014). A possible mechanism of action for the placebo response: human biofield activation via therapeutic ritual. International Journal of Transpersonal Studies, 33(1), 131–147.. *International Journal of Transpersonal Studies, 33* (1). http://dx.doi.org/10.24972/ijts.2014.33.1.131

# A Possible Mechanism of Action for the Placebo Response: Human Biofield Activation Via Therapeutic Ritual

## Cover Page Footnote

The authors wish to thank Glenn Hartelius for his contributions to this article, as he was instrumental in assisting the formulation of the thesis during inception of the writing, and to supplementing the final draft.

# A Possible Mechanism of Action for the Placebo Response: Human Biofield Activation Via Therapeutic Ritual

*Marie Grace Brook*
Sofia University
Palo Alto, CA, USA

*Randy Fauver*
JFK University
Pleasant Hill, CA, USA

The lack of an identified mechanism of action for the placebo response contributes to its perception as clinically unimportant in Western medicine and minimizes its value as a contributing factor to the effectiveness of both conventional and alternative medical treatments. The therapeutic ritual is one of the principle contributors to the placebo response. Two key elements predicting salutogenic outcomes in both the placebo response and therapeutic ritual are patient meaning making and the patient/healer relationship. A detailed examination of human biofield dynamics shows its role in storing, communicating, and regulating the flow of information associated with healing in Western and non-Western medical models. The human biofield is particularly responsive to psychospiritual inputs, which may provide a model explaining the mechanism of action for these otherwise anomalous healing responses. Transpersonal studies provide methodological tools suitable to addressing the multiple paradigms found to be effective within the placebo response and therapeutic rituals, leading to the possible development of a transpersonal medicine.

**Keywords:** ***Placebo effect, placebo response, healing ritual, therapeutic ritual, biofield, electromagnetic fields, biophotons, ultra-weak photon emission***

The lack of a compelling, consistent, and coherent explanatory theory for the placebo response contributes to its perception as clinically unimportant in Western medicine (Benedetti, 2009), minimizes its value as a contributing factor in the effectiveness of pharmacological treatments (F. G. Miller, Emanuel, Rosenstein, & Straus, 2004), allows it to be used to explain away beneficial alternative medical treatments (Walach, 2009), and impedes the "systematic exploration of its scope" (Ader, 1997, p. 138; cf. Benedetti, 2009; F. G. Miller, Colloca, & Kaptchuk, 2009). One of several elements found to elicit the placebo response is the therapeutic or healing ritual, particularly within a therapeutic relationship. Whether the ritual takes the form of an indigenous healer wielding a rattle or a physician wielding a stethoscope seems not to matter. The ritual itself and the meaning the patient makes of it consistently contribute to mobilization of innate healing resources. This paper suggests that therapeutic or healing ritual activity impacts the human biofield in beneficial ways, which then mediates the observed physical effects attributed to a placebo response. Activation of specific changes in the biofield through participation in therapeutic ritual is proposed as a possible mechanism for placebo responses.

*Placebo* describes a medical treatment with no recognized clinical effectiveness—for example, a sugar pill. The *placebo response* occurs when people given a placebo respond as though they had been given an effective treatment.

*Therapeutic ritual healing* is the recovery from illness or pain resulting from a therapeutic ritual between healer and patient (Harrington, 2011; Wampold, Minami, Tierney, Baskin, & Bhati, 2005). Positive physical changes have resulted from therapeutic rituals taking a wide variety of forms, including physical, mental, emotional, or spiritual interventions, both inside and outside Western models of care (Harrington, 2011; Wampold, 2007). Its mechanism of action is poorly understood.

*Biofield* is the name given to the electromagnetic field that permeates and surrounds living organisms (Jain & Mills, 2010; Nelson & Schwartz, 2005; Rein, 2004; Rubik, 2002; Warber, Gordon, Gillespie, Olson, & Assefi, 2003). It is the scientifically preferred term for the biologically produced electromagnetic and subtle energy field that provides regulatory and communication functions within the human organism.

These terms will be considered in turn; then a theoretical model of the placebo response will be proposed in which the dynamic interaction of these

elements elicits healing changes in the body; concluding that the healthcare field might fruitfully grow through developing a transpersonal medicine that incorporates all treatment modalities with demonstrated effectiveness.

**Placebo Response**

During the transition of Western medicine from its magico-religious roots to a secular science in ancient Greece, the physician Hippocrates wrote of the placebo response, "Some patients, though conscious that their condition is perilous, recover their health simply through their contentment with the goodness of the physician" (as quoted in Nuland, 1989, p. 17). The placebo response was first tested in the 1700s. Elisha Perkins had created small metal rods he called tractors from a secret alloy, which he then passed over areas of inflammation, rheumatism, or pain in suffering clients. His patients responded so well to these treatments that he spent his life fabricating and using these tractors. Thinking his treatments were a hoax, after his death a group of physicians tested Perkins' treatment by replacing his metal tractors with rods made of wood. Surprisingly, the sham tractors produced results identical to the real tractors. Although patients treated with the sham tractors showed improvement, the group of physicians proclaimed Perkins' treatment ineffective because its mechanism of action could not be identified (Miller, 1935).

The healing results of Perkins' tractors and other placebos have been variously attributed to the power of suggestion, classical conditioning, the desire to please, or to the expectancy effect (Thompson, Ritenbaugh, & Nichter, 2009). With Western medicine's focus on pharmaceutical treatments, little thought or attention has been given by researchers and clinicians to placebo responses, their magnitude, mechanisms of action, or optimal treatment components for maximizing effect size (Ernst, 2007). Despite being arguably the single most researched medical treatment—due to placebo controlled clinical trials in which the effectiveness of various placebos is regularly demonstrated—there is widespread doubt in Western medicine as to whether placebo responses exist at all (Hróbjartsson & Gøtzsche, 2001).

Historically the placebo response has been dismissed as clinically unimportant (Beecher, 1955). This is a somewhat paradoxical situation, since if any conventional intervention were to prove as effective in as wide a variety of conditions, it would undoubtedly be considered a wonder treatment. The marginalization of placebo may be due to the fact that it is not easily compatible with the context of conventional medical treatment, where its mechanism is either unknown or, at best, the result of something along the lines of wishful thinking. On the other hand, because complementary and alternative medical (CAM) approaches to treatment typically think about mechanisms of healing in ways that differ from standard medical models, such approaches may provide a context more conducive to the understanding and meaningful use of placebo.

An example of placebo results that could be considered either remarkable or completely without importance can be seen in A United States National Institutes of Health (NIH) funded a study by Cherkin et al. (2009). This study was designed to compare the relative merits of conventional Western medical treatments and three variations of acupuncture treatment—an intervention based in Traditional Chinese Medicine (TCM)—for people with chronic lower back pain. The study's treatment conditions included: a) conventional Western medical treatment consisting of pain medications and physical therapy, b) sham acupuncture treatment in which no needles were actually inserted although they seemed to be, c) standardized acupuncture treatment, and d) individualized acupuncture treatment.

At 8 weeks after treatments began, participants in the conventional treatment group reported a mean improvement of 2.1 points on a 1 to 10 scale of how bothersome their pain had been during the past week. Participants in the acupuncture groups reported mean improvements of 4.4, 4.5, and 4.4 points respectively. On a measure of physical dysfunction, 39% of patients in the conventional care group demonstrated clinically meaningful improvement while 60% of patients in the three acupuncture groups showed clinically meaningful improvement. The conventional care patients received regular treatment for the next year, while treatment in the acupuncture groups ended after 7 weeks. At one-year follow up, 50% of patients receiving conventional care showed meaningful improvement in physical dysfunction. The figures in the acupuncture groups were 59% in the sham treatment group and 65% in both the standardized and individualized treatment groups. The difference in outcomes between acupuncture treatment and conventional treatment at the one-year follow up was significant at the $p < .001$ level. The difference between sham acupuncture and genuine acupuncture

was not statistically significant at the $p < .05$ level after adjusting for multiple comparisons.

Setting aside for moment the issue of mechanism, it would appear that both acupuncture treatment and sham acupuncture produced about twice the relief from pain and 50% greater clinically meaningful improvement at 8 weeks—as compared with conventional medical treatment—and about 10-15% greater improvement after a year, despite the fact that the acupuncture interventions lasted only 7 weeks as compared with the year-long application of conventional treatment. This would seem to be positive evidence for the efficacy of acupuncture treatments for chronic low back pain, which is how the results were typically presented in alternative medical journals. Representative of this perspective, one meta-analysis of this and other alternative interventions, concluded that "CAM treatments [acupuncture, massage, spinal manipulation, and mobilization] were more effective in reducing pain and disability compared to no treatment, physical therapy . . . , or usual care immediately or at short-term follow-up" (Furlan et al., 2012, p. 1), while also acknowledging that the CAM treatment results were similar to placebo treatment results.

Yet this was not the interpretation applied to these results within conventional medical journals, which tended to cite the Cherkin et al. (2009) study as evidence that acupuncture does not work because it failed to demonstrate statistically significant efficacy when compared with placebo (O'Connell, Wand, & Goldacre, 2009). Some drew the conclusion that there is "little truly convincing evidence that acupuncture is effective in reducing pain" (Ernst, Lee, & Choi, 2011, p. 755). An influential medical blogger used the study's results as support in a call to eliminate federal funding of CAM research (Orac, 2009, May 13). However, if one were to apply such logic evenhandedly to the results of the Cherkin et al. (2009) study, one could conclude with similar certainty that standard treatment approaches were measurably less effective than placebo results, and that therefore the use of pain medication and physical therapy for chronic low back pain should be called into question.

There are other approaches to interpreting the results of the Cherkin et al. (2009) study: The alleged sham acupuncture treatment might itself have an unrecognized therapeutic impact, or there might be some element common to the acupuncture process—whether or not needles were inserted—that accounted for the efficacy of treatment. As an example of the first option, the possibility has been advanced that even light touch of the skin, as would typically be used to simulate the insertion of acupuncture needles, may stimulate mechanoreceptors coupled to slow conducting unmyelinated afferents, which might in turn impact the affective component of pain (Lund & Lundeberg, 2006). While other studies have suggested that some differences in physiological impact may exist between acupuncture treatment and sham acupuncture treatment (e.g., Harris et al., 2009), a meta-analysis has provided evidence that superficial needling at non-points may be as effective for some conditions as traditional needling at acupuncture points (Moffet, 2009). It may be prudent to retain some skepticism of protocols that purport to simulate acupuncture treatment without having any therapeutic effect (e.g., Park, White, Stevinson, Ernst, & James, 2002).

However, any specific factors that might be called on to account for all or part of a placebo response associated with alleged sham acupuncture is not sufficient to account for the range of placebo responses observed over many trials and involving a wide variety of placebos. The second option for explanation—that the experience of going for an acupuncture treatment might itself serve as a therapeutic ritual with some efficacious impact quite apart from whether needles are inserted traditionally, superficially, or not at all—may be more relevant as a way to situate this particular instance as an example of a broader placebo phenomenon. The next section will consider the evidence for such a mechanism.

Before moving on, it may be helpful to consider another finding relevant to the efficacy of placebo treatments, which comes from a large scale meta-analysis of treatment compliance effects in pharmaceutical studies. Simpson et al. (2006) evaluated all placebo-controlled drug treatment studies found on eight medical databases containing reports of both treatment compliance and mortality rates. The included studies involved more than 46,000 participants being treated for heart disease, HIV infections, diabetes, and other conditions. The researchers found high compliance participants in treatment conditions experienced roughly half the mortality of low compliance participants. High compliance participants in the placebo conditions also experienced roughly half the mortality of low compliance participants. Not included in the analyses but briefly reported in the text was that mortality rates were slightly

lower among participants in placebo conditions than treatment conditions (p. 17).

In a cursory review of the first 100 articles citing the Simpson et al. (2006) study, conducted for this paper by the second author, the overwhelming response in the medical literature was to call for increased patient treatment compliance to pharmaceutical regimens, with little to no attention given to the increased mortality risk associated with such treatments or to the demonstrated lack of efficacy when compared with placebo treatments. People's belief that they were actively and consistently doing something to improve their health proved to be just as effective in preserving life as the use of prescription medications across a broad range of life-threatening diseases and medication regimens. Since a meaning-making response appeared to be operative in both the treatment and placebo conditions, these results raise questions about the relative contribution of pharmaceuticals and placebo in drug treatments, suggesting placebo-related effects may provide much of the observed medical benefit.

Rather than being an isolated example, the Simpson et al. (2006) meta-analysis represents an emerging trend. As placebo-controlled drug trial designs have become more rigorous over the past decades, outcome differences between placebo and treatment arms have consistently decreased to such a degree that "recently studied treatments offered only small benefits in efficacy over placebo" (Olfson & Marcus, 2013, p. 1116; cf. Kirsch, Moore, Scoboria, & Nicholls, 2002). Although some CAM modalities may be inefficacious in the sense of not providing evidence of benefit beyond placebo, they may still bring about improvements in patient health and wellbeing comparable or superior to usual care. As expressed by Simpson et al. (2006), the new direction of inquiry needed in placebo studies should concern how, rather than whether, the non-specific effects of the placebo response might be used and optimized.

Two high-powered meta-analyses, considered together, may represent the beginning of a shift in attitude toward placebos. A meta-analysis published by the Cochrane Database of Systematic Reviews in 2004 (Hróbjartsson & Gøtzsche, 2004) reported no evidence for important clinical effects from placebo interventions. Just six years later a follow-up meta-analysis (Hróbjartsson & Gøtzsche, 2010) found sufficient evidence to support the use of placebo as an effective treatment for pain.

Spurred by research results indicating clinical effectiveness, the placebo response has garnered increasing attention from clinicians and researchers alike (Ernst, 2007; Frenkel, 2008; Kaptchuk et al., 2010; Wampold, Imel, & Minami, 2007). Harvard Medical School launched its Program in Placebo Studies and the Therapeutic Encounter (PiPS) in response to the evidence suggesting placebos substantively contribute to improvements in patient outcomes. The program's website opens with this statement:

> For many years, the placebo effect was considered to be no more than a nuisance variable that needed to be controlled in clinical trials. Only recently have researchers redefined it as the key to understanding the healing that arises from medical ritual, the context of treatment, the patient-provider relationship and the power of imagination, trust and hope. (PiPS, 2014, para. 1)

It had previously been assumed that deception was necessary for placebos to work. However, Kaptchuk et al. (2010) found that even when people knew they were being given placebos, their health improvement was comparable to people being given pharmaceutical medications. The researchers emphasized, "Our results challenge 'the conventional wisdom' that placebo effects require 'intentional ignorance'" (p. 6). They outlined four parameters that, if met, would likely render deception in placebo use unnecessary: "(1) an accurate description of what is known about placebo effects, (2) encouragement to suspend disbelief, (3) instructions that foster a positive but realistic expectancy, and (4) directions to adhere to the medical ritual of pill taking" (p. 6).

Hull et al. (2013) used a telephone survey to assess public opinion regarding use of placebos. The researchers asked a sample of 853 patients in the Kaiser Permanente insurance system of northern California about their attitudes towards being given placebos by doctors. Results showed that 50-84% of respondents viewed placebo treatments as acceptable according to doctors' level of certainty about the benefits and safety of the treatment, the purpose of the treatment, and the transparency with which the treatment was described to patients. Only 22% of respondents replied that placebo treatments would be unacceptable.

Within the medical community several investigations have sought to identify mechanisms of action for the placebo response (Borkovec & Sibrava,

2005; Gerard, Smith, & Simpson, 2003; Tsubono, Thomlinson, & Shealy, 2009). Moerman and Jonas (2002) studied components active within the placebo response and came to redefine the placebo response as a meaning-making response to the therapeutic encounter, a definition supported by others seeking to engage this healing response (Frenkel, 2008; Walach & Jonas, 2004). The new definition "acknowledges that humans are not deterministic machines reacting to mechanical causes (e.g., pharmacologic agents). Rather, they are responding to signs and the meaning those signs generate in a highly complex, often self-determined and sometimes unpredictable fashion" (Walach & Jonas, 2004, p. 104). The healing response may be understood as arising from the totality of the patient's history, understandings, environment, and goals, as well as from the medical interventions. With this more integrative understanding of the healing process, people become active participants in their own healing rather than passive recipients of medical care.

The meaning-making response has produced healing effects across disciplines, interventions, and diseases (Walach & Jonas, 2004). Even sham knee surgeries have yielded functional and subjective outcomes equal to those obtained by genuine surgeries (Moseley et al., 2002). Ernst (2006, 2007) proposed several specific determinants of placebo effectiveness, including patient and therapist expectation, patient compliance, patient involvement, the clinical setting, the pathology in question, and the chronicity of the condition. These qualities activating the placebo response are also characteristic of the therapeutic ritual. Kwan (2007) wrote, "[ritual] healing . . . is a result of a therapeutic act which triggers autonomous healing. . . It relates intimately to the phenomenon of placebo effect" (p. 744). Kaptchuk et al. (2008) suggested that "the term therapeutic ritual can be equated with placebo treatment" (p. 999).

### Therapeutic Ritual Healing

While therapeutic ritual is recognized as an important component in the healing endeavor, its relative contribution to physical healing is not well understood, and its mechanism of action even less so. Ritual can be defined in a variety of contexts such as anthropology (Turner, 1969), sociology (Moore & Myerhoff, 1977), religion (Rappaport, 1999), psychotherapy (Roberts, 1988), and psychopathology (Fiske & Haslam, 1997). Many of these definitions characterize ritual as participation in some sort of prescribed symbolic actions. Limiting the term ritual to its use as a transformative power for healing, ritual becomes known as therapeutic ritual (e.g., Hyland & Whalley, 2008) or healing ritual (e.g., Kaptchuk, 2002). Different types of therapeutic rituals activate the placebo or meaning making response in patients to varying degrees. Sometimes therapeutic rituals used in conventional and alternative treatment approaches elicit the same levels of placebo response, as found by a meta-analysis of CAM treatments for irritable bowel syndrome (Dorn et al., 2007); sometimes therapeutic rituals used in CAM approaches appear more effective than those used in conventional treatments, as found in the previously mentioned study on lower back pain (Cherkin et al., 2009); and sometimes the conventional approach yields higher placebo response rates than CAM approaches, as in Freeman et al.'s (2010) meta-analysis of CAM and conventional treatments for depression.

The observed healing benefits of traditional medical systems such as indigenous healing practices, Ayurvedic medicine from India, Traditional Chinese Medicine, and naturopathy, have often been attributed entirely to therapeutic ritual healing (Kwan, 2007; Wampold et al., 2005), as have the observed benefits of energy-medicine techniques such as Reiki, qigong, and Therapeutic Touch (Ernst, 2006; Jonas & Chez, 2003; Martin & Henderson, 2011; Rein, 2004). The broad array of settings and treatment modalities in this expanded description of therapeutic ritual encompass all dimensions of the human experience, including body, mind, and spirit, and have all been equated with the placebo response by medical researchers (Harrington, 2011; Kaptchuk, 2011; Ostenfeld-Rosenthal, 2012; Thompson et al., 2009).

Theories abound regarding the processes and components of therapeutic rituals. Kwan (2007) wrote that "healing … is a result of a therapeutic act … which triggers autonomous healing … [related to the] performative efficacy of the act" (italics in the original; p. 744). Kwan described a transformative process in successful rituals that includes entry into and departure from an altered state of consciousness. He described this process as a three-fold sequence through which the patient is guided by an authority figure: a) separation, involving removal from the original fixed point in the social structure or social conditions; b) between-and-betwixt, involving standing on a threshold; and c) aggregation, involving re-entry into a new stable state

with transformed psycho-social positioning (p. 746). According to Kwan, less of the therapeutic ritual's effectiveness is attributable to meaning understood by participants and more to how it is performed. He theorized that ritual performance involves three characteristics, all of which must be present for healing to be successful: a) dynamic (i.e., powerful and moving; b) diachronic (i.e., adjusting with time); and c) physical (i.e., occurring in the body and material world).

According to the theory of ritual as placebo, both the setting and the presence of a respected authority figure encourage patients to access levels of healing within themselves, and to ignite the self-healing capabilities that already exist within the human psycho-physiological organism (Hyland & Whalley, 2008; Kaptchuk et al., 2010; Kwan, 2007). In studying correlations between traditional and modern settings, some researchers have posited that meaning-making within the healing ritual is key for healing in both systems (Wampold et al., 2007). The healing authority accorded to shamans and healers in traditional cultures may be analogous to the medical authority accorded to Western physicians by state licensing boards. The authority figure uses the healing ritual, in whatever setting, to assist the participants in making meaning of their illness and of their role in society (Larsen, 2007).

Implicit within the therapeutic ritual is the therapeutic relationship. The person seeking healing invites a relationship with another to initiate the healing process. The other may take the form of a person such as a doctor, psychotherapist, massage therapist, or indigenous healer; it may be a principle or idea, such as the notion of being of service; or the other could take the form of a divine being or something larger than the self. These healing relationships and the rituals involved evoke feelings of belonging and safety in an environment of social and cultural order or coherence. As a result, the ill person develops a sense of control or empowerment (Jonas & Chez, 2004, p. 171).

Hyland and Whalley (2008) measured motivational concordance and response expectancy to identify their possible role as mechanisms of action for therapeutic ritual. Motivational concordance is the degree to which a participant's motivation is generated by a ritual in alignment with the person's belief system or goals, and response expectancy is the expectation of a non-volitional response. The researchers concluded that response expectancy had insignificant influence on outcomes, whereas patients' motivational concordance with the underlying premise of the intervention appeared to correlate with improvement in their condition.

Frenkel (2008) suggested that philosopher Merleau-Ponty's concept of motor intentionality better fits the evidence showing response expectancy's minor role in the placebo response. He theorized that the body relates to and can respond to meaning from a place of reflexive consciousness based more on the healing ritual's contextual representations than on conceptual or linguistic communications (p. 58). Frenkel's motor intentionality model implies the physiological effects of therapeutic rituals occur through direct embodiment of meaning rather than through conscious communication.

In attempting to find the mechanism of action of therapeutic healing rituals, a variety of clinical and experimental studies have given evidence of several characteristics that may play a part in their effectiveness, such as meaning-making for the patient (Larsen, 2007), the quality of performance of the ritual healer (Kwan, 2007), the patient-practitioner relationship (Hyland & Whalley, 2008; Kaptchuk et al., 2008), and response from reflexive body consciousness (Frenkel, 2008).

Several studies have identified specific salutogenic components of the healing ritual. As was found in placebo response studies, meaning making appears to be an integral aspect of successful ritual healing interventions (Kaptchuk, 2011; Kwan, 2007; Larsen, 2007). A Danish ethnographic study (Larsen, 2007) involving 15 clients during two years of biopsychosocial treatment attributed the power of ritual healing to meaning-making, noting that there seems to be a universal structure of content as well as procedure in healing ceremony. Larsen detailed four components of meaning making in what he referred to as symbolic healing: a) shared cultural context, b) therapeutic relationship, c) symbolically relating patient's situation to a key concept of the cultural context, and d) transformation of the patient's experiences and self-perception. The rituals used in Larsen's work involved creating a shared mythic world based on scientific and biomedical theories about mental illness.

Mainguy, Valenti Pickren, and Mehl-Madrona (2013) verified these four constructs, demonstrated that shared cultural context can be based on shared beliefs rather than shared acculturation, and found the level of spiritual transformation experienced during therapeutic rituals positively correlated with psychological and

physical healing. They matched 155 non-Native-American patients who requested traditional indigenous healing with Native American healers from several tribes. A five-year follow-up revealed that 44 of the participants reported profound spiritual transformation, defined as sudden and powerful improvement in the spiritual dimension of their lives. "The level of spiritual transformation was associated in a dose-response relationship with subsequent improvement in medical illness in 134 of 155 people ($p < .0001$)" (p. 4).

Kaptchuk et al. (2008) used a randomized controlled experiment to isolate which factors played the most important part of effectiveness in therapeutic ritual: a) assessment and observation b) placebo treatment, and c) patient-practitioner relationship. The 262 participants with irritable bowel syndrome were randomized into three groups. All three groups were assessed and observed. The first group was waitlisted, the second group was given placebo acupuncture by an impersonal practitioner, and the third group was given placebo acupuncture by a practitioner exuding warmth, attention, and confidence. Results indicated the factors contributing to enhanced placebo responses can be progressively combined to produce dose-escalation results that are both statistically and clinically significant, and that the patient-practitioner relationship was the key determinant of therapeutic ritual effectiveness.

These varying theories and research findings are neither in conflict with each other nor mutually exclusive, but thus far none explain therapeutic ritual healing's actual mechanism of action; rather, they identify some of the psycho-socio-spiritual characteristics which appear to activate the healing process. When maximized, these common factors are said to induce meaning or context responses, and appear to be the same factors identified as producing the placebo response. To understand how the psychosocial and spiritual dimensions of a patient's experience might produce physical healing, some researchers have turned to the dynamics of the biofield.

## Biofield

> ***We are now in the process of revising the past century's biochemical concept, under which all major life processes are chemical in nature, to one that proposes that such processes are electromagnetic in nature.*** **(Becker, 2004, p. 17)**

Biofield is the scientific name given to the electric, magnetic, electromagnetic (EM), and subtle energy field that permeates and surrounds living organisms (Jain & Mills, 2010; Nelson & Schwartz, 2005; Rein, 2004; Rubik, 2002; Warber et al., 2003). Traditional and colloquial terms for the biofield include aura, energy, chakra system, life force, chi, ki, prana, and subtle energy. In 1994 a panel of medical scientists at the NIH created the term biofield (Rubik, 2002), defining it as "a complex, extremely weak electromagnetic field of the organism hypothesized to involve electromagnetic bioinformation for regulating homeodynamics" (p. 703). The Quantum Biology Research Lab (Rein, 2004) expanded this definition of the biofield to include a quantum energy field, which is responsive to nonlocal healing treatment modalities and can trigger the body's innate self-healing mechanisms. Their expanded model suggested "bioinformation, mediated by consciousness, functions globally at the quantum level to supply coherence, phase, spin, and pattern information to regulate and heal all physiologic processes" (p. 59).

Starting at the grossest level, the EM portions of the biofield are supported by the well-known informational, functional, and regulatory activities of the body's neuronal system. Consciousness and cognition through EM activity may not be limited to the central nervous system, however. Dr. Andrew Armour (1991), while performing some early mapping of the heart's neuronal system, discovered both afferent and efferent neurons connecting the heart not just to the brain but also to the rest of the body. In his reference book for clinical cardiologists (Armour & Ardell, 1994), Armour described the heart's intrinsic neural system as the heart brain. The complex networks of cardiac neuronal ganglia satisfy the structural requirements identified by Merker (2007) as being necessary within the Western medical paradigm to support consciousness and cognition. Armour (1999) wrote the heart brain is able to "process information, learn, remember and produce feelings of the heart and then transmit information from one cell to another, including emotional information" (p. 41). Measurements of neuronal signal transmission indicate more information is sent from the heart to the brain and the rest of the body than from the brain to the heart (McCraty, Atkinson, Tomasino, & Bradley, 2009).

Less well known but equally well documented are the separate regulatory and communication functions of the body's EM fields beyond the direct mechanical linkages of neural pathways. The brain's electrical activities demonstrate holographic field

patterns congruent with quantum level coherence and communication (Hameroff, 2007; Jibu & Yasue, 1995). The heart too produces complex EM fields laden with physiological and psychological information (Wallot, Fusaroli, Tylen, & Jegindø, 2013). The heart's electrical waves have an amplitude about 60 times larger than those produced by the brain and its magnetic field is about 5,000 times stronger than the brain's, making it the body's most potent source of EM information (McCraty, Bradley, & Tomasino, 2005). The EM fields produced by the brain and the heart permeate the body, influencing the function of every cell, tissue, organ, and system (Funk, Monsees, & Özkucur, 2009; Geng, Li, Wan, & Xu, 2014; Stavroulakis, 2003).

At a more refined level, the notion of a biofield finds support in the recent research into biophotons, also known as ultra-weak photonic emissions. All living cells and organisms emit coherent, low intensity light in the form of biophotons. These electromagnetic radiations span from the ULF range of less than 30 Hz, up through the visible light spectrum, and continue past the ultraviolet range up to approximately 1015 Hz. Although not usually visible to the naked eye, the light can be reliably measured using photomultipliers (Bischof, 2005; Popp, Gu, & Li, 1994).

Biophotonic emissions were first recognized in the early 20th century by the Russian botanist Alexander Gurwitsch. He realized communications triggering cell division could pass from one plant to another through some types of glass but not through others (Gurwitsch, 1925). As technologies became more sensitive, biophotons were found to result from some biochemical reactions, notably oxidative processes (Salin & Bridges, 1981). More recent work shows DNA also emits biophotons (Cohen & Popp, 1997; Popp et al., 1984) and that the light can be stored inside of cells (Bokkon, Salari, Tuszynski, & Antal, 2010). Current examinations have identified a host of informational, communicational, and regulatory functions for biophotons. "Biological regulation takes place by electromagnetic interaction within the cells (visible biophoton regime), between cells (infrared biophotons), between organs (radio wave biophotons) and between macroscopic parts of the whole system (ELF-waves)" (Popp, 2008, p. 381).

Assessment of biophotonic activity shows promise as a diagnostic tool within the Western medical model (Brownstein et al., 2007; Ives et al., 2014), with significant differences in photon emission patterns having been found between healthy and diseased organisms (van Wijk & van Wijk, 2005). Differences in biophoton emission rates also appear between groups of healthy cells and cancer cells, with increasing emission rates correlated with increasing malignancy of tumor cells (Popp, 2009; Schamhart & van Wijk, 1987; Scholz, Staszkiewicz, Popp, & Nagl, 1988).

Correlations have also been found between the locations of biophotonic activity and acupuncture meridians (Popp, 2008). Histology studies have found the tissues of the meridian systems, which are the pathways for qi in the body, preferentially transmit biophotons along their lengths, and stimulation of acupuncture points by needle or laser elicited increased biophoton emission from related acupuncture points on the same meridian (van Wijk, van der Greef, & van Wijk, 2010). Traditional Chinese Medicine (TCM) says the human energy field fluctuates with the time of day and with the season. The rates of biophotonic emission have been found to match these circadian (Cifra, van Wijk, Koch, Bosman, & van Wijk, 2007; van Wijk, van Wijk, & Cifra, 2007) and seasonal predictions (Cohen & Popp, 1997; Jung et al., 2005). In TCM theory, illness results from an imbalance of qi within the body. The associations found between qi activity and biophoton activity suggest illness, and by extension health and healing, could be related to biofield activity, defined as including biophoton activity.

Although measurement of the subtler dimensions of the biofield remains elusive (Hammerschlag et al., 2012), research evidence suggests subtle fields can provide clinically meaningful support for physical healing. Randomized controlled trials performed in medical settings have shown biofield therapies to be effective in such diverse ways as reducing the immune-compromising effects of radiation through use of Healing Touch with cervical cancer patients (Lutgendorf et al., 2010) and reducing persistent cancer-related fatigue while increasing diurnal cortisol variability towards healthy levels through use of energy chelation treatments with breast cancer survivors (Jain et al., 2012). A comprehensive review (Jain & Mills, 2010) of clinical trials involving yoga, Tai Chi, QiGong, meditation, prayer, acupuncture, homeopathy, Therapeutic Touch, Healing Touch, and Reiki attributed the positive health effects to the treatments' interaction with patient biofields. Rubik (2002) has suggested that biofield research might prove essential for the scientific

understanding of energy medicine. She described bioelectromagnetics as a possible bridge between objective physics and subjective physiological processes.

## Biofield Effects of the Therapeutic Ritual

What is the nature of the relationship between therapeutic ritual, the human biofield, and healing effects? If the meaning making endeavor and the therapeutic relationship are common to placebo healing, conventional medical treatments, and therapeutic ritual, how might these affect the biofield and how then might the biofield mediate the physical changes associated with healing?

### Meaning Making

Turning first to meaning making, successful navigation of illness often requires coming to a place of understanding about the role of the illness in the person's life and how the person relates to family, friends, and society at large. In this regard, psychological counseling has been found effective for both mental and physical health of patients with chronic medical conditions (Gatchel, Peng, Peters, Fuchs, & Turk, 2007), and has been shown to extend the lives of people with cancer (Andersen et al., 2008; Kangas, Bovbjerg, & Montgomery, 2008). Cancer patients utilizing positive psychosocial coping strategies have shown significant increases in their sense of meaning in life, which included spirituality, feelings of inner peace, life satisfaction, and matters of faith (Jim, Richardson, Golden-Kreutz, & Andersen, 2006).

Successful resolution of meaning-making efforts appears to confer significant medical benefits, including for people with cancer (Kaiser, Bodey, Siegel, Gröger, & Bodey, 2000; Kleef, Jonas, Knogler, & Stenzinger, 2001). Many people who have experienced spontaneous remission of cancer, which by definition cannot be attributed to the action of known medical agents, report comprehensive introspection and spiritual transformation as an integral part of their healing process (Hirschberg & Barasch, 1996; O'Regan & Hirschberg, 1993).

The process of introspection and spiritual transformation is usually followed by feelings of peace and a sense of purpose, which are consistently correlated with increased physical wellbeing and fewer depressive symptoms (Brady, Peterman, Fitchett, Mo, & Cella, 1999; Edmondson, Park, Blank, Fenster, & Mills, 2008; Krupski et al., 2006; Nelson, Rosenfeld, Breitbart, & Galietta, 2002). These end states are similar in many ways to the results of meditation and mindfulness practices, which have been shown to initiate a cascade of health-supporting changes in the biofield. Brain waves and heart electrical activity slow, leading to whole body relaxation through activation of the parasympathetic nervous system, all of which produce better health outcomes (Sapolsky, 2004). These changes in the body's electromagnetic fields directly communicate with and coordinate positive changes in genetic expression, cell and organ activities, immune system functions, and mental and emotional states (Stavroulakis, 2003).

Positive emotional states, meditation, and mindfulness practices also lead to increased retention of biophotons within individual cells and the body as a whole (van Wijk, Koch, Bosman, & van Wijk, 2006). Popp, Gu, and Li reported (1994) that colonies of single celled organisms adjusted their populations to a size that allows them to retain the most biophotonic light within the colony. Similarly, healthy people's cells retain more light in the form of biophotons than do the cells of unhealthy people (Popp, 2008; van Wijk & van Wijk, 2005). This is consistent with the finding that cancerous tissues emit more biophotons than do their neighboring, healthy tissues, which retain biophotons (Popp, 2009; Schamhart & van Wijk, 1987; Scholz et al., 1988).

### Therapeutic Relationship

The therapeutic relationship has been identified as an important part of the therapeutic ritual. One component of the therapeutic relationship generalized to other treatment modalities from Carl Rogers' humanistic psychology is the use of unconditional positive regard. Holding a positive affective stance during the ritual leads to more coherent heart and brainwave synchronization in both the therapist and the client, along with increased heart rate variability (McCraty et al., 2005). Both these indicators have consistently been shown to strongly support physical, psychological, and spiritual health and healing (e.g., McCraty et al., 2009).

Therapist mindfulness positively correlates with therapeutic alliance and treatment outcomes (Ryan, Safran, Doran, & Muran, 2012). The dynamic interplay of biofields between healer and healee may be causally involved in the finding that clients perceive sessions as more effective when their psychotherapist practiced just five minutes of mindfulness meditation immediately before a session (Dunn, Callahan, Swift, & Ivanovic, 2013). Mindfulness meditation training results in increased medical student empathy (Shapiro, Schwartz, & Bonner, 1998), which could improve patient healing

in Western medical settings as medical school training has been found to reduce physician empathy (Hojat et al., 2004; Newton, Barber, Clardy, Cleveland, & O'Sullivan, 2008).

Two other important aspects of the therapeutic relationship are empathy, which is a sense of affective alignment between healer and healee, and the related therapeutic alliance, in which both parties experience affiliative cognitive and affective connection and agree on therapeutic interventions and intended outcomes (Hyland & Whalley, 2008). These deeper connections within the therapeutic ritual enable access to information and emotions that might otherwise remain hidden from view, increasing the possibility of transformative meaning-making outcomes (Elliott, Bohart, Watson, & Greenberg, 2011). When a person changes their mental state the quantity and quality of their biophoton emissions change as well (Popp, 2009; van Wijk et al., 2006). A transformative change in worldview leads to substantial changes in their biofield, which could directly influence the person's physical expression.

The positive affective stance of the healer may directly influence patient physiology. The heart's EM field extends well beyond the physical body, having been measured at least 12 feet away, and the EM waves produced by one person's heart have been shown to influence another person's brain waves several feet away (McCraty et al., 2005). Given the previously mentioned informational content and regulating influence of the EM biofield on physiological and psychological functions, it is not unreasonable to suggest two proximally situated people engaged in a therapeutic ritual would mutually influence each other's biofields in such a way as to potentially produce or enhance beneficial effects within the patient.

This deepened sense of coherence and connection within the therapeutic ritual seems to activate dynamic interpersonal characteristics of the biofield. Heart EM waves have been shown to synchronize to the more coherent partner's patterns (McCraty et al., 2005), helping to form a shared connection. Besides the previously mentioned physiological effects, changes in heart wave patterns can even produce changes in DNA conformation at a distance (McCraty, Atkinson, & Tomasino, 2003).

The sense of connection between people appears to play an important role in producing remote changes in the EM field. Researchers at Bastyr University in Seattle, WA (Standish, Kozak, Johnson, & Richards, 2004) recorded the brainwave patterns of pairs of emotionally bonded couples who were long-term meditation practitioners. The partners had been placed in separate rooms about thirty feet apart, with a third room in between. A visual stimulus known to trigger a characteristic brainwave pattern was shown at random times to one partner, the sender. The brainwave pattern of the other partner, the receiver, responded with the same characteristic brainwave pattern at the same times as the sender.

Persinger's research team at Laurentian University in Canada (Dotta, Buckner, Lafrenie, & Persinger, 2011) performed multiple experiments with paired cultures of human brain cells in matched EM fields. Brain cells increase biophoton emission when stimulated by an external light source. The researchers exposed one cell culture to a light stimulus and discovered that the spatially isolated receiver culture emitted a higher number of biophotons in synchrony with the sender culture.

Persinger's team later performed a similar series of experiments (Burke, Gauthier, Rouleau, & Persinger, 2013) with human subjects located 300 kilometers (186 miles) apart. The subjects in both locations wore helmets producing matched magnetic fields, which artificially created a type of coherent relationship between them. In response to randomly timed audio stimuli, a highly localized structure in the sender's brain emitted more than twice the usual number of biophotons. In response, the receiver's brain was found to also emit more than twice the usual number of photons from the same highly localized structure in instantaneous synchrony with the sender.

One final example comes from work using the subtler aspects of the biofield. A study done in Hawaii (Achterberg et al., 2005) looked at fMRI readings for subjects receiving distant healing intention from one of eleven spatially isolated healers using several different healing techniques. The subjects' brain activity changed in response to the healing intentions, with the types of changes observed being uniquely distinct to each type of healing provided.

Even at these subtler levels of the biofield, empirical evidence points toward biofield impact of local and distant healing activity, and anomalous connections between people, that is currently unaccounted for within conventional medical and scientific models.

These connections—consistent with notions of a biofield of some sort—and the reported physiological impacts they produce, add supportive evidence for the possibility of a mediating role for the human biofield in bringing about therapeutic ritual healing.

## Conclusion

The biofield acts as a complex communication system using a broad range of electromagnetic frequencies to carry messages from the environment to the organism, from the organism to the environment, and within the organism itself (Dossey, 2003; Schlitz et al., 2003; Warber et al., 2003). The biofield encompasses all cells and organs, the space around the person, and connection to other distant stimuli (Hintz et al., 2003). Its information-laden, wave-oriented transference of energy appears to be capable of carrying messages of healing, and its capacity to give instructions to damaged organs and cells appears to be instantaneous. This field, which appears to be at least partially electromagnetic in nature, may help to structure the body's functions at every level of organization, appears to be sensitively responsive to cognitive and emotional states resulting from meaning making efforts, and seems capable of being influenced by others through the therapeutic relationship. The biofield hypothesis offers a subtle, pervasive, and powerful system of organization and communication that may be sufficient to explain the transformation of therapeutic rituals into physical healing, commonly referred to as the placebo response.


## Acknowledgment

The authors wish to thank Glenn Hartelius for his contributions to this article, as he was instrumental in assisting the formulation of the thesis during inception of the writing, and to supplementing the final draft.


## References


Achterberg, J., Cooke, K., Richards, T., Standish, L. J., Kozak, L., & Lake, J. (2005). Evidence for correlations between distant intentionality and brain function in recipients: A functional magnetic resonance imaging analysis. *Journal of Alternative & Complementary Medicine, 11*(6), 965-971. doi:10.1089/acm.2005.11.965

Ader, R. (1997). The role of conditioning in pharmacotherapy. In A. Harrington (Ed.), *The placebo effect: An interdisciplinary exploration* (pp. 138-165). Cambridge, MA: Harvard University Press.

Andersen, B. L., Yang, H.-C., Farrar, W. B., Golden-Kreutz, D. M., Emery, C. F., Thornton, L. M., … Carson, W. E., III. (2008). Psychologic intervention improves survival for breast cancer patients: A randomized clinical trial. *Cancer*, *113*(12), 3450-3458. doi:10.1002/cncr.23969

Armour, J. A. (1991). Intrinsic cardiac neurons. *Journal of Cardiovascular Electrophysiology, 2*(4), 331-341. doi:10.1111/j.1540-8167.1991.tb01330.x

Armour, J. A. (1999). Myocardial ischaemia and the cardiac nervous system. *Cardiovascular Research, 41*(1), 41-54. doi:10.1016/s0008-6363(98)00252-1

Armour, J. A., & Ardell, J. L. (Eds.). (1994). *Neurocardiology*. New York, NY: Oxford U. P.

Becker, R. O. (2004). Exploring new horizons in electromedicine. *The Journal of Alternative & Complementary Medicine, 10*(1), 17-18. doi:10.1089/107555304322848904

Beecher, H. K. (1955). The powerful placebo. *JAMA: The Journal of the American Medical Association, 159*, 1602-1606. doi:10.1001/jama.1955.02960340022006

Benedetti, F. (2009). *Placebo effects: Understanding the mechanisms in health and disease*. Oxford, UK: Oxford University Press.

Bischof, M. (2005, March). Biophotons: The light in our cells. *Journal of Optometric Phototherapy*, 1-5. Retrieved from http://www.collegeofsyntonicoptometry.com/pdf/journals/March2005.pdf

Bokkon, I., Salari, V., Tuszynski, J., & Antal, I. (2010). Estimation of the number of biophotons involved in the visual perception of a single-object image: Biophoton intensity can be considerably higher inside cells than outside. *Journal of Photochemistry and Photobiology B: Biology, 100*(3), 160-166. doi:10.1016/j.jphotobiol.2010.06.001

Borkovec, T. D., & Sibrava, N. J. (2005). Problems with the use of placebo conditions in psychotherapy research, suggested alternatives, and some strategies for the pursuit of the placebo phenomenon. *Journal of Clinical Psychology, 61*(7), 805-818. doi:10.1002/jclp.20127

Brady, M. J., Peterman, A. H., Fitchett, G., Mo, M., & Cella, D. (1999). A case for including spirituality in quality of life measurement in oncology. *Psycho-Oncology*, *8*(5), 417-428.

Brownstein, M., Hoffman, R. A., Levenson, R., Milner, T. E., Dowell, M. L., Williams, P. A., … Hwang, J. C. (2007). Biophotonic tools in cell and tissue

diagnostics. *Journal of Research of the National Institute of Standards and Technology, 112*(3), 139-152. doi:10.6028/jres.112.011

Burke, R. C., Gauthier, M. Y., Rouleau, N., & Persinger, M. A. (2013). Experimental demonstration of potential entanglement of brain activity over 300 km for pairs of subjects sharing the same circular rotating, angular accelerating Magnetic fields: Verification by s_LORETA, QEEG measurements. *Journal of Consciousness Exploration & Research, 4*(1), 35-44.

Cherkin, D. C., Sherman, K. J., Avins, A. L., Erro, J. H., Ichikawa, L., Barlow, W. E., … Deyo, R. A. (2009). A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. *Archives of Internal Medicine, 169*(9), 858-866. doi:10.1001/archinternmed.2009.65

Cifra, M., van Wijk, E. P. A., Koch, H., Bosman, S., & van Wijk, R. (2007). Spontaneous ultra-weak photon emission from human hands is time dependent. *Radioengineering, 16*(2), 15-19.

Cohen, S., & Popp, F.-A. (1997). Low-level luminescence of the human skin. *Skin Research and Technology, 3*(3), 177-180. doi:10.1111/j.1600-0846.1997.tb00184.x

Dorn, S. D., Kaptchuk, T. J., Park, J. B., Nguyen, L. T., Canenguez, K., Nam, B. H., … Lembo, A. J. (2007). A meta-analysis of the placebo response in complementary and alternative medicine trials of irritable bowel syndrome. *Neurogastroenterology & Motility, 19*(8), 630-637. doi:10.1111/j.1365-2982.2007.00937.x

Dossey, L. (2003). Samueli Conference on Definitions and Standards in Healing Research: Working definitions and terms. *Alternative Therapies in Health & Medicine, 9*(3 Suppl), A10-12.

Dotta, B. T., Buckner, C. A., Lafrenie, R. M., & Persinger, M. A. (2011). Photon emissions from human brain and cell culture exposed to distally rotating magnetic fields shared by separate light-stimulated brains and cells. *Brain research, 1388*, 77-88. doi:10.1016/j.brainres.2011.03.001

Dunn, R., Callahan, J. L., Swift, J. K., & Ivanovic, M. (2013). Effects of pre-session centering for therapists on session presence and effectiveness. *Psychotherapy Research, 23*(1), 78-85. doi:10.1080/10503307.2012.731713

Edmondson, D., Park, C. L., Blank, T. O., Fenster, J. R., & Mills, M. A. (2008). Deconstructing spiritual well-being: Existential well-being and HRQOL in cancer survivors. *Psycho-Oncology*, *17*(2), 161-169. doi:10.1002/pon.1197

Elliott, R., Bohart, A. C., Watson, J. C., & Greenberg, L. S. (2011). Empathy. *Psychotherapy, 48*(1), 43-49. doi:10.1037/a0022187

Ernst, E. (2006). Complementary and alternative medicine: Examining the evidence. *Community Practitioner, 79*(10), 333-336.

Ernst, E. (2007). Placebo, deceit and complementary/alternative medicine. *Climacteric, 10*(2), 85-87. doi:10.1080/13697130701276087

Ernst, E., Lee, M. S., & Choi, T.-Y. (2011). Acupuncture: Does it alleviate pain and are there serious risks? A review of reviews. *Pain, 152*(4), 755-764. doi:10.1016/j.pain.2010.11.004

Fiske, A. P., & Haslam, N. (1997). Is obsessive compulsive disorder a pathology of the human disposition to perform socially meaningful rituals? Evidence of similar content. *Journal of Nervous and Mental Disease*, *185*(4), 211-222. doi:10.1097/00005053-199704000-00001

Freeman, M. P., Mischoulon, D., Tedeschini, E., Goodness, T., Cohen, L. S., Fava, M., & Papakostas, G. I. (2010). Complementary and alternative medicine for major depressive disorder: A meta-analysis of patient characteristics, placebo-response rates, and treatment outcomes relative to standard antidepressants. *Journal of Clinical Psychiatry, 71*(6), 682-688. doi:10.4088/JCP.10r05976blu

Frenkel, O. (2008). A phenomenology of the 'placebo effect': Taking meaning from the mind to the body. *Journal of Medicine and Philosophy, 33*(1), 58-79. doi:10.1093/jmp/jhm005

Funk, R. H., Monsees, T., & Özkucur, N. (2009). Electromagnetic effects: From cell biology to medicine. *Progress in Histochemistry and Cytochemistry, 43*(4), 177-264. doi:10.1016/j.proghi. 2008.07.001

Furlan, A. D., Yazdi, F., Tsertsvadze, A., Gross, A., Van Tulder, M., Santaguida, L., … Doucette, S. (2012). A systematic review and meta-analysis of efficacy, cost-effectiveness, and safety of selected complementary and alternative medicine for neck and low-back pain. *Evidence-Based Complementary and Alternative Medicine, 2012*(953139), 1-61. doi:10.1155/2012/953139

Gatchel, R. J., Peng, Y. B., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin*, *133*(4), 581-624. doi:10.1037/0033-2909.133.4.581

Geng, D. Y., Li, C. H., Wan, X. W., & Xu, G. Z. (2014). Biochemical kinetics of cell proliferation regulated by extremely low frequency electromagnetic field. *Bio-Medical Materials and Engineering, 24*(1), 1391-1397. doi:10.3233/BME-130943

Gerard, S., Smith, B. H., & Simpson, J. A. (2003). A randomized controlled trial of spiritual healing in restricted neck movement. *The Journal of Alternative & Complementary Medicine, 9*(4), 467-477. doi:10.1089/107555303322284758

Gurwitsch, A. G. (1925). The mitogenetic rays. *Botanical Gazette, 80*(2), 224-226. doi:10.1086/333527

Hameroff, S. R. (2007). The brain is both neurocomputer and quantum computer. *Cognitive Science, 31*(6), 1035-1045. doi:10.1080/03640210701704004

Hammerschlag, R., Jain, S., Baldwin, A. L., Gronowicz, G., Lutgendorf, S. K., Oschman, J. L., & Yount, G. L. (2012). Biofield research: A roundtable discussion of scientific and methodological issues. *Journal of Alternative & Complementary Medicine, 18*(12), 1081-1086. doi:10.1089/acm.2012.1502

Harrington, A. (2011). The placebo effect: What's interesting for scholars of religion? *Zygon, 46*(2), 265-280. doi:10.1111/j.1467-9744.2010.01188.x

Harris, R. E., Zubieta, J.-K., Scott, D. J., Napadow, V., Gracely, R. H., & Clauw, D. J. (2009). Traditional Chinese acupuncture and placebo (sham) acupuncture are differentiated by their effects on mu-opioid receptors (MORs). *Neuroimage*, *47*(3), 1077-1085.

Hintz, K. J., Yount, G. L., Kadar, I., Schwartz, G., Hammerschlag, R., & Lin, S. (2003). Bioenergy definitions and research guidelines. *Alternative Therapies in Health and Medicine, 9*(3; Supp), A13-A30.

Hirschberg, C., & Barasch, M. (1996). *Remarkable recovery: What extraordinary healings tell us about getting well and staying well*. New York, NY: Riverhead Trade.

Hojat, M., Mangione, S., Nasca, T. J., Rattner, S., Erdmann, J. B., Gonnella, J. S., & Magee, M. (2004). An empirical study of decline in empathy in medical school. *Medical Education, 38*(9), 934-941. doi:10.1111/j.1365-2929.2004.01911.x

Hróbjartsson, A., & Gøtzsche, P. C. (2001). Is the placebo powerless? An analysis of clinical trials comparing placebo with no treatment. *New England Journal of Medicine*, *344*(21), 1594-1602. doi:10.1056/NEJM200105243442106

Hróbjartsson, A., & Gøtzsche, P. C. (2004). Placebo treatment versus no treatment. *Cochrane Database of Systematic Reviews*. doi:10.1002/14651858.CD003974

Hróbjartsson, A., & Gøtzsche, P. C. (2010). Placebo interventions for all clinical conditions. *Cochrane Database of Systematic Reviews*. doi:10.1002/14651858.CD003974.pub3

Hull, S. C., Colloca, L., Avins, A., Gordon, N. P., Somkin, C. P., Kaptchuk, T. J., & Miller, F. G. (2013). Patients' attitudes about the use of placebo treatments: Telephone survey. *BMJ, 347*, f3757. doi:10.1136/bmj.f3757

Hyland, M. E., & Whalley, B. (2008). Motivational concordance: An important mechanism in self-help therapeutic rituals involving inert (placebo) substances. *Journal of Psychosomatic Research, 65*(5), 405-413. doi:10.1016/j.jpsychores.2008.02.006

Ives, J. A., van Wijk, E. P. A., Bat, N., Crawford, C., Walter, A., Jonas, W. B., … van der Greef, J. (2014). Ultraweak photon emission as a non-invasive health assessment: A systematic review. *PloS ONE, 9*(2), e87401. doi:10.1371/journal.pone.0087401

Jain, S., & Mills, P. J. (2010). Biofield therapies: Helpful or full of hype? A best evidence synthesis. *International Journal of Behavioral Medicine, 17*(1), 1-16. doi:10.1007/s12529-010-9122-9

Jain, S., Pavlik, D., Distefan, J., Bruyere, R. R. L., Acer, J., Garcia, R., … Jonas, W. B. (2012). Complementary medicine for fatigue and cortisol variability in breast cancer survivors. *Cancer, 118*(3), 777-787. doi:10.1002/cncr.26345

Jibu, M., & Yasue, K. (1995). *Quantum brain dynamics and consciousness: An introduction*. Philadelphia, PA: John Benjamins.

Jim, H. S., Richardson, S. A., Golden-Kreutz, D. M., & Andersen, B. L. (2006). Strategies used in coping with a cancer diagnosis predict meaning in life for survivors. *Health Psychology*, *25*(6), 753-761.

Jonas, W. B., & Chez, R. A. (2003). The role and importance of definitions and standards in healing research. *Alternative Therapies in Health and Medicine, 9*(3 Suppl), A5.

Jonas, W. B., & Chez, R. A. (2004). Recommendations regarding definitions and standards in healing research. *The Journal of Alternative & Complementary Medicine, 10*(1), 171-181. doi:10.1089/107555304322849101

Jung, H.-H., Yang, J.-M., Woo, W.-M., Choi, C., Yang, J.-S., & Soh, K.-S. (2005). Year-long biophoton measurements: Normalized frequency count analysis and seasonal dependency. *Journal of Photochemistry and Photobiology B: Biology, 78*(2), 149-154. doi:10.1016/j.jphotobiol.2004.08.002

Kaiser, H. E., Bodey, B., Jr., Siegel, S. E., Gröger, A. M., & Bodey, B. (2000). Spontaneous neoplastic regression: The significance of apoptosis. *In Vivo*, *14*(6), 773-788.

Kangas, M., Bovbjerg, D. H., & Montgomery, G. H. (2008). Cancer-related fatigue: A systematic and meta-analytic review of non-pharmacological therapies for cancer patients. *Psychological Bulletin*, *134*(5), 700-741. doi:10.1037/a0012825

Kaptchuk, T. J. (2002). The placebo effect in alternative medicine: Can the performance of a healing ritual have clinical significance? *Annals of Internal Medicine*, *136*(11), 817-825. doi:10.7326/0003-4819-136-11-200206040-00011

Kaptchuk, T. J. (2011). Placebo studies and ritual theory: A comparative analysis of Navajo, acupuncture and biomedical healing. *Philosophical Transactions of the Royal Society B: Biological Sciences, 366*(1572), 1849-1858. doi:10.1098/rstb.2010.0385

Kaptchuk, T. J., Friedlander, E., Kelley, J. M., Sanchez, M. N., Kokkotou, E., Singer, J. P., . . . Lembo, A. J. (2010). Placebos without deception: A randomized controlled trial in irritable bowel syndrome. *PLoS One, 5*(12), e15591. doi:10.1371/journal.pone.0015591

Kaptchuk, T. J., Kelley, J. M., Conboy, L. A., Davis, R. B., Kerr, C. E., Jacobson, E. E., … Nguyen, L. T. (2008). Components of placebo effect: Randomised controlled trial in patients with irritable bowel syndrome. *BMJ, 336*(7651), 999-1003. doi:10.1136/bmj.39524.439618.25

Kirsch, I., Moore, T. J., Scoboria, A., & Nicholls, S. S. (2002). The emperor's new drugs: An analysis of antidepressant medication data submitted to the U.S. Food and Drug Administration. *Prevention & Treatment*, *5*(1), n.p. doi:10.1037/1522-3736.5.1.523a

Kleef, R., Jonas, W. B., Knogler, W., & Stenzinger, W. (2001). Fever, cancer incidence and spontaneous remissions. *Neuroimmunomodulation*, *9*(2), 55-64. doi:10.1159/000049008

Krupski, T. L., Kwan, L., Fink, A., Sonn, G. A., Maliski, S., & Litwin, M. S. (2006). Spirituality influences health related quality of life in men with prostate cancer. *Psycho-Oncology*, *15*(2), 121-131. doi:10.1002/pon.929

Kwan, S. S.-m. (2007). Clinical efficacy of ritual healing and pastoral ministry. *Pastoral Psychology, 55*(6), 741-749. doi:10.1007/s11089-007-0079-9

Larsen, J. A. (2007). Symbolic healing of early psychosis: Psychoeducation and sociocultural processes of recovery. *Culture, Medicine and Psychiatry, 31*(3), 283-306. doi:10.1007/s11013-007-9055-1

Lund, I., & Lundeberg, T. (2006). Are minimal, superficial or sham acupuncture procedures acceptable as inert placebo controls? *Acupuncture in Medicine*, *24*, 13-15. doi:10.1136/aim.24.1.13

Lutgendorf, S. K., Mullen-Houser, E., Russell, D., DeGeest, K., Jacobson, G., Hart, L., . . . Lubaroff, D. M. (2010). Preservation of immune function in cervical cancer patients during chemoradiation using a novel integrative approach. *Brain, Behavior, and Immunity, 24*(8), 1231-1240. doi:10.1016/j.bbi.2010.06.014

Mainguy, B., Valenti Pickren, M., & Mehl-Madrona, L. (2013). Relationships between level of spiritual transformation and medical outcome. *Advances in Mind-Body Medicine, 27*(1), 4-11.

Martin, W. M., & Henderson, J. (2011). Complementary and alternative medicine: A survey of the top 25 U.S. health plans. *The Business Review, Cambridge, 18*(1), 198-204.

McCraty, R., Atkinson, M., & Tomasino, D. (2003). *Modulation of DNA conformation by heart-focused intention* (Publication No. 03-008). HeartMath Research Center, Boulder Creek, CA.

McCraty, R., Atkinson, M., Tomasino, D., & Bradley, R. T. (2009). The coherent heart: Heart-brain interactions, psychophysiological coherence, and the emergence of system-wide order. *Integral Review, 5*(2), 10-115.

McCraty, R., Bradley, R. T., & Tomasino, D. (2005). The resonant heart. *Shift: At the Frontiers of Consciousness, 5*, 15-19.

Merker, B. (2007). Consciousness without a cerebral cortex: A challenge for neuroscience and medicine. *Behavioral and Brain Sciences, 30*(01), 63-81. doi:10.1017/S0140525X07000891

Miller, F. G., Colloca, L., & Kaptchuk, T. J. (2009). The placebo effect: Illness and interpersonal healing. *Perspectives in Biology and Medicine*, 52(4), 518-539. doi:10.1353/pbm.0.0115

Miller, F. G., Emanuel, E. J., Rosenstein, D. L., & Straus, S. E. (2004). Ethical issues concerning research in complementary and alternative medicine. *Journal of the American Medical Association*, *291*(5), 599-604. doi:10.1001/jama.291.5.599

Miller, W. S. (1935). Elisha Perkins and his metallic tractors. *Yale Journal of Biology and Medicine, 8*(1), 41-57. Retrieved from http://medicine.yale.edu/yjbm

Moerman, D. E., & Jonas, W. B. (2002). Deconstructing the placebo effect and finding the meaning response. *Annals of Internal Medicine, 136*(6), 471-476. doi:10.7326/0003-4819-136-6-200203190-00011

Moore, S. F., & Myerhoff, B. G. (1977). *Secular ritual*. Assen, The Netherlands: Van Gorcum.

Moseley, J. B., O'Malley, K., Petersen, N. J., Menke, T. J., Brody, B. A., Kuykendall, D. H., … Wray, N. P. (2002). A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *New England Journal of Medicine, 347*(2), 81-88. doi:10.1056/NEJMoa013259

Moseley, J. B., O'Malley, K., Petersen, N. J., Menke, T. J., Brody, B. A., Kuykendall, D. H., … Wray, N. P. (2002). A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *New England Journal of Medicine*, *347*(2), 81-88. doi:10.1056/NEJMoa013259

Nelson, C. J., Rosenfeld, B., Breitbart, W., & Galietta, M. (2002). Spirituality, religion, and depression in the terminally ill. *Psychosomatics: Journal of Consultation Liaison Psychiatry*, *43*(3), 213-220. doi:10.1176/appi.psy.43.3.213

Nelson, L. A., & Schwartz, G. E. (2005). Human biofield and intention detection: Individual differences. *Journal of Alternative & Complementary Medicine, 11*(1), 93-101. doi:10.1089/acm.2005.11.93

Newton, B. W., Barber, L., Clardy, J., Cleveland, E., & O'Sullivan, P. (2008). Is there hardening of the heart during medical school? *Academic Medicine, 83*(3), 244-249. doi:10.1097/ACM.0b013e3181637837

Nuland, S. B. (1989). *Doctors: The biography of medicine*. New York, NY: Vintage Books.

O'Connell, N. E., Wand, B. M., & Goldacre, B. (2009). Interpretive bias in acupuncture research?: A case study. *Evaluation & the Health Professions, 32*(4), 393-409. doi:10.1177/0163278709353394

O'Regan, B., & Hirschberg, C. (1993). *Spontaneous remission: An annotated bibliography*. Petaluma, CA: Institute of Noetic Sciences.

Olfson, M., & Marcus, S. C. (2013). Decline in placebo-controlled trial results suggests new directions for comparative effectiveness research. *Health Affairs*, *32*(6), 1116-1125. doi:10.1377/hlthaff.2012.1353

Orac. (2009, May 13). Another acupuncture study misinterptreted [Web log post]. Retrieved from http://scienceblogs.com/insolence/2009/05/13/another-acupuncture-study-misinterpreted/

Ostenfeld-Rosenthal, A. M. (2012). Energy healing and the placebo effect. An anthropological perspective on the placebo effect. *Anthropology & Medicine, 19*(3), 327-338. doi:10.1080/13648470.2011.646943

PiPS. (2014). *Program in Placebo Studies and the Therapeutic Encounter*. Retrieved from www.programinplacebostudies.org

Popp, F.-A. (2008). Principles of complementary medicine in terms of a suggested scientific basis. *Indian Journal of Experimental Biology, 46*(5), 378-383.

Popp, F.-A. (2009). Cancer growth and its inhibition in terms of coherence. *Electromagnetic Biology and Medicine, 28*(1), 53-60. doi:10.1080/15368370802711805

Popp, F.-A., Gu, Q., & Li, K.-H. (1994). Biophoton emission: Experimental background and theoretical approaches. *Modern Physics Letters B, 08*(21&22), 1269-1296. doi:doi:10.1142/S0217984994001266

Popp, F.-A., Nagl, W., Li, K. H., Scholz, W., Weingärtner, O., & Wolf, R. (1984). Biophoton emission. New evidence for coherence and DNA as source. *Cell Biophysics, 6*(1), 33-52. doi:10.1007/bf02788579

Rappaport, R. A. (1999). *Ritual and religion in the making of humanity* (vol. 110). Cambridge University Press. doi:10.1017/CBO9780511814686

Rein, G. (2004). Bioinformation within the biofield: Beyond bioelectromagnetics. *The Journal of Alternative & Complementary Medicine, 10*(1), 59-68. doi:10.1089/107555304322848968

Roberts, J. (1988). Setting the frame: Definitions, functions, and typology of rituals. In E. Imber-Black, J. Roberts, & R. Whiting (Eds.), *Rituals in families and family therapy*. New York, NY: W. W. Norton.

Rubik, B. (2002). The biofield hypothesis: Its biophysical basis and role in medicine. *The Journal of Alternative & Complementary Medicine, 8*(6), 703-717. doi:10.1089/10755530260511711

Ryan, A., Safran, J. D., Doran, J. M., & Muran, J. C. (2012). Therapist mindfulness, alliance and treatment outcome. *Psychotherapy Research, 22*(3), 289-297. doi:10.1080/10503307.2011.650653

Salin, M. L., & Bridges, S. M. (1981). Chemiluminescence in wounded root tissue: Evidence for peroxidase involvement. *Plant Physiology*, 43-46. doi:10.1104/pp.67.1.43

Sapolsky, R. M. (2004). *Why zebras don't get ulcers* (3rd ed.). New York, NY: St. Martin's Griffin.

Schamhart, D. H. J., & van Wijk, R. (1987). Photon emission and the degree of differentiation. In J. Jezowska-Trzebiatowska, J. Slawinski & W. Strek (Eds.), *Photon emission from biological systems* (pp. 137-152). Singapore: World Scientific.

Schlitz, M., Radin, D., Malle, B. F., Schmidt, S., Utts, J., & Yount, G. L. (2003). Distant healing intention: Definitions and evolving guidelines for laboratory studies. *Alternative Therapies in Health and Medicine, 9*(3), A31-43. Retrieved from Alternative Therapies in Health and Medicine website: http://www.alternative-therapies.com/

Scholz, W., Staszkiewicz, U., Popp, F.-A., & Nagl, W. (1988). Light-stimulated ultraweak photon reemission of human amnion cells and wish cells. *Cell Biophysics, 13*(1), 55-63. doi:10.1007/BF02797365

Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine, 21*(6), 581-599. doi:10.1023/A:1018700829825

Simpson, S. H., Eurich, D. T., Majumdar, S. R., Padwal, R. S., Tsuyuki, R. T., Varney, J., & Johnson, J. A. (2006). A meta-analysis of the association between adherence to drug therapy and mortality. *British Medical Journal*, *333*(7557), 15-20. doi:10.1136/bmj.38875.675486.55

Standish, L. J., Kozak, L., Johnson, L. C., & Richards, T. (2004). Electroencephalographic evidence of correlated event-related signals between the brains of spatially and sensory isolated human subjects. *Journal of Alternative & Complementary Medicine, 10*(2), 307-314. doi:10.1089/107555304323062293

Stavroulakis, P. (2003). *Biological effects of electromagnetic fields: Mechanisms, modeling, biological effects, therapeutic effects, international standards, exposure criteria*. New York, NY: Springer.

Thompson, J. J., Ritenbaugh, C., & Nichter, M. (2009). Reconsidering the placebo response from a broad anthropological perspective. *Culture, Medicine, and Psychiatry, 33*(1), 112-152. doi:10.1007/s11013-008-9122-2

Tsubono, K., Thomlinson, P., & Shealy, C. N. (2009). The effects of distant healing performed by a spiritual healer on chronic pain: A randomized controlled trial. *Alternative Therapies in Health & Medicine, 15*(3), 30-34.

Turner, V. (1969). *The ritual process: Structure and anti-structure*. New York, NY: Aldine de Gruyter.

van Wijk, E. P. A., Koch, H., Bosman, S., & van Wijk, R. (2006). Anatomic characterization of human ultra-weak photon emission in practitioners of Transcendental Meditation™ and control subjects. *Journal of Alternative & Complementary Medicine, 12*(1), 31-38. doi:10.1089/acm.2006.12.31

van Wijk, E. P. A., van Wijk, R., & Cifra, M. (2007, June. *Spontaneous ultra-weak photon emission from human hands varies diurnally.* Paper presented at the European Conference on Biomedical Optics, Munich, Germany.

van Wijk, R., van der Greef, J., & van Wijk, E. P. A. (2010). Human ultraweak photon emission and the Yin Yang concept of Chinese Medicine. *Journal of Acupuncture and Meridian Studies, 3*(4), 221-231. doi:10.1016/S2005-2901(10)60041-6

van Wijk, R., & van Wijk, E. P. A. (2005). An introduction to human biophoton emission. *Forschende Komplementärmedizin und klassische Naturheilkunde (Research in Complementary and Natural Classical Medicine), 12*(2), 77-83. doi:10.1159/000083763

Walach, H. (2009). The campaign against CAM and the notion of "evidence-based". *The Journal of Alternative and Complementary Medicine*, *15*(10), 1139-1142. doi:10.1089=acm.2009.0423

Walach, H., & Jonas, W. B. (2004). Placebo research: The evidence base for harnessing self-healing capacities. *Journal of Alternative & Complementary Medicine, 10*(Spring), 103-112. doi:10.1089/1075553042245773

Wallot, S., Fusaroli, R., Tylen, K., & Jegindø, E.-M. (2013). Using complexity metrics with R-R intervals and BPM heart rate measures. *Frontiers in Physiology*, *4*(211). doi:10.3389/fphys.2013.00211

Wampold, B. E. (2007). Psychotherapy: The humanistic (and effective) treatment. *American Psychologist, 62*(8), 857-873. doi:10.1037/0003-066X.62.8.857

Wampold, B. E., Imel, Z. E., & Minami, T. (2007). The placebo effect: "Relatively large" and "robust" enough to survive another assault. *Journal of Clinical Psychology, 63*(4), 401-403. doi:10.1002/jclp.20350

Wampold, B. E., Minami, T., Tierney, S. C., Baskin, T. W., & Bhati, K. S. (2005). The placebo is powerful: Estimating placebo effects in medicine and psychotherapy from randomized clinical trials. *Journal of Clinical Psychology, 61*(7), 835-854. doi:10.1002/jclp.20129

Warber, S. L., Gordon, A., Gillespie, B. W., Olson, M., & Assefi, N. (2003). Standards for conducting clinical biofield energy healing research. *Alternative Therapies in Health and Medicine, 9*(3), A54-A64.

**About the Authors**

***Marie Grace Brook, PhD(c), LCSW,*** is a spiritual director, psychotherapist, and doctoral student at Sofia University (formerly the Institute of Transpersonal Psychology). She has a Masters in Social Work from Denver University and a graduate certification in spiritual direction from Fordham University, as well as certifications from the Rolf Institute and Upledger Institute. She conducted a private practice and created a school in healing arts in Durango, Colorado, then later worked as a hospice social worker. She served as an adjunct professor at the graduate schools of social work in Denver University, CO and Highlands University, NM. Her papers have been published in NASW's *Children & Schools* and in SDI's *Presence*. Her current doctoral research explores integration of spiritually transformative experiences. She has a private practice in spiritual direction and psychotherapy in Santa Cruz, CA, www.mariegracebrook.com.

***Randy Fauver, PhD,*** is a professor and researcher in the fields of psychology, consciousness studies, and integrative medicine. He holds a BS from Bastyr University in Health Psychology and Spirituality, a PhD from the Institute of Transpersonal Psychology in Psychology, and a certification in Mind Body Medicine from Harvard University and has taken integrative medicine courses at Stanford University. He spent several years living in Native American communities in Colorado training under their spiritual leaders; is a Research Fellow with the BIAL Foundation; and has taught Narrative Medicine, done NIH-funded research, and developed an Integral Health program at Stanford University's School of Medicine.