

2011

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Recommended Citation

Gronowicz, Gloria A., "Therapeutic Touch and Cancer Cells" (2011). *UCHC Graduate School Masters Theses 2003 - 2010*. 167.
https://opencommons.uconn.edu/uchcgs_masters/167

THERAPEUTIC TOUCH AND CANCER CELLS

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Abstract

Energy medicine therapies based on a human biofield have been practiced for thousands of years and can trace their origin in Ayurveda. Our goal was to determine if Therapeutic Touch (TT), a more recently developed energy medicine practice, had any effects on cancer cells. Previous work in our laboratory demonstrated that TT significantly increased the growth of normal human osteoblasts and increased the synthesis of bone matrix proteins and mineralization in cell culture. In this study as was practiced in our previous studies, TT was performed twice a week for 10 minutes and was compared to untreated cultures and 'placebo-treated' cultures. Two different cell lines of human bone cancer, osteosarcoma, were used; Saos-2 and HOS, derived from different patients. TT significantly ($p=0.01$) decreased HOS proliferation determined by radioactive thymidine incorporation into the DNA, but had no significant effect on Saos-2 cells compared to untreated control and placebo-treated groups. At 2 weeks, TT significantly decreased mineralization, determined by assaying calcium content of the cell layer of Saos-2 and HOS cells ($p=0.03$), compared to control and placebo-treated cultures. Additionally, Northern blot analysis indicated a TT-induced decrease in mRNA expression for several bone matrix proteins in both Saos-2 and HOS cell cultures. In conclusion, Therapeutic Touch decreased differentiation and bone formation in human osteosarcoma-derived cells and significantly decreased cell growth in the HOS but not in Saos-2 cells. These results demonstrate that a human biofield exists, which is able to affect cell activities and may have therapeutic value in patients.

Introduction

The concept of a human energy field has been found in the earliest civilizations in human existence. Over 5,000 year ago, Ayurvedic practitioners spoke of a universal energy called Prana, which was considered the source and basic constituent of life. Since those early times, numerous cultures have developed their own energy medicine practice and concepts of the human biofield. Western scientists are just beginning to try to study the nature of this energy.

Therapeutic Touch (TT) is a recently developed human biofield therapy that was pioneered by Dr. Dolores Krieger and Dora Kunz in the early 1970s in the United States (1)(2) and is still taught to many nurses. Modern day TT is purported to promote healing through biological "energy fields" or biofields and involves the direction of life energy through the hands of the practitioner to restore balance and focus energy into a recipient, who is then able to self-heal. TT does not require physical contact between the practitioner and the recipient. In clinical studies, Therapeutic Touch has been shown to have a numerous effects (3). In a recent article, Jain and Mills (4) reviewed the literature on biofield therapies and stated that there was strong evidence that biofield therapies reduce pain intensity in pain populations, and that there was moderate evidence for reducing pain intensity for hospitalized and cancer populations. Moderate significant evidence was also found for biofield therapies decreasing negative behavioral symptoms in dementia and for decreasing anxiety of hospitalized patients. Effects on fatigue and quality of life for cancer patients were not as clear. In several review articles and meta-analyses of these clinical studies, there was enough data from multiple studies to show that TT had significant clinical effects but most studies were underpowered with poor statistical analysis(5) (6). Few in vitro studies have been performed, however, Radin, et al, demonstrated that human biofield therapy increased the number of colonies of human astrocytes, if it was applied repeatedly, but not from a single application (7). Additional studies showed different human biofield therapies decreased the growth rate of a human prostate cancer cell line (8), induced cell death (apoptosis) in a prostate cancer cell line (9) and induced apoptosis in a pancreatic cancer cell line by inhibition of AKT and NF- κ B signaling pathways but had no effect on normal cells (10). Human biofield therapy also increased intracellular free calcium concentrations in a human leukemic T cell line within minutes of treatment and the effect was shown to be mediated by Na⁺/Ca²⁺ exchangers and L-type voltage gated Ca²⁺ channels (11). We have shown that TT significantly stimulates the growth of normal cells isolated from human tendon, bone and skin with two ten minute treatment per week for 2 weeks(12). In addition, the same TT treatment regimen was shown to increase significantly the ability of the human osteoblast cultures to calcify and produce the mRNA levels for bone matrix proteins necessary for bone formation (13).

We chose Therapeutic Touch for our studies because the practice of TT has five well-defined steps, is not associated with any religion, can be used in conjunction with standard medical care and a rigorous training process is required for licensure in TT. Most importantly, TT may benefit the patient since the practitioner attempts to promote healing with intentions aimed for the greater good of the patient so that the patient may self-heal.

Methods and Results

Our initial studies with TT were focused on TT effects on cells in culture, so that we could eliminate the mind-body connection that is found in studies involving patients and practitioners, investigate the possible effects of TT on cells with controlled experiments that could be rigorously analyzed with statistics. To determine significance between groups, a statistician, independent of this study until data evaluation, reviewed the data and used the Wilcoxon-Rank Sum test to describe significance as p values of less than 0.05. Our experiments involved bone cancer cells (two human osteosarcoma cell lines, Saos-2 and HOS from the American Type Culture Collection (ATCC), Manassas, VA). Three Therapeutic Touch (TT) practitioners participated in this study. They had practiced energy medicine for over five years and had also passed a TT screening test administered at the University of Connecticut Health Center (3). TT was adapted to our study and was performed by holding the hands at least 4-10 inches from the culture dish. Treatments were 10 minutes and were administered twice a week. Control (untreated) and experimental tissue cultures plates were removed from an incubator and clamped above a bench top on either end of a L shaped laboratory. Experiments were also performed using a placebo control individual with no knowledge of TT, who treated identically prepared cell cultures, used similar hand movements and counted backwards from 1000 to prevent any healing thoughts or intentions. All experiments had six samples/group and each experiment was repeated at least twice.

Cells were plated at a density of 10,000 cells/cm² onto tissue culture plates for experiments. All assays were performed in a "blinded" manner without knowledge of the groups. The groups were identified after the data were compiled. Cell proliferation was determined by a biochemical assay, [³H]-thymidine incorporation into the DNA. During the last four hours of culture, [³H] thymidine (5 mCi/ml) was added to the cells in culture. Then the cell layers were extracted and the amount of radioactive thymidine (disintegrations per minute, dpm) incorporated into the DNA was determined by a liquid scintillation counter. TT had no significant effect on the proliferation of Saos-2 cells but significantly ($p < 0.01$) inhibited HOS proliferation compared to untreated(c) and placebo (p)(Figure 1).

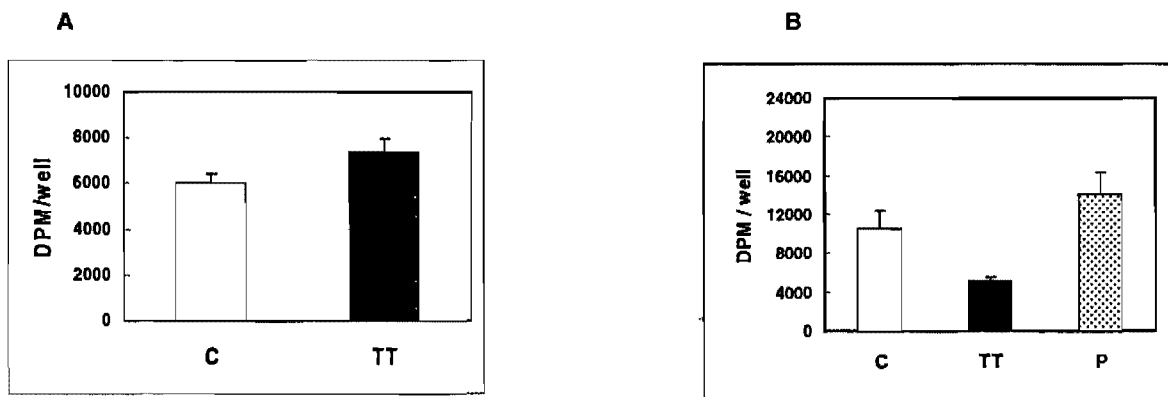


Figure 1 demonstrates that Therapeutic Touch has no effect on the growth of Saos-2 cells (A) but significantly ($*=p < 0.01$) inhibited HOS (B) cell growth measured by [³H] thymidine incorporation into the cells (disintegrations per minute, dpm) compared to untreated(c) and placebo (p).

TT significantly inhibited mineralization in these bone cell cultures, as determined by biochemically measuring calcium content of both Saos-2 and HOS cultures. At two weeks of culture with and without TT treatment, cells were extracted twice for 30 minutes with 5% trichloroacetic acid, and the amount of calcium in the extraction medium was determined biochemically using a commercially available kit (Eagle Diagnostics, De Soto, Tx). After 2 weeks of TT treatment, TT significantly inhibited mineralization by 44% in Saos-2 cultures and by 58% in HOS ($p < 0.03$) compared to controls (Figure 2). Experiments with a placebo control had no significant effect on mineralization and were similar to untreated control values.

Since bone formation occurs by the sequential synthesis and secretion of extracellular proteins to form a matrix which subsequently mineralizes, Northern blot analyses of mRNA levels for the bone matrix proteins; alkaline phosphatase (AP), bone sialoprotein (BSP) Type I collagen, and osteocalcin (OC) were performed. After two weeks of culture, total RNA was extracted from the cells by a standard method (12, 13). After a 2-week applica

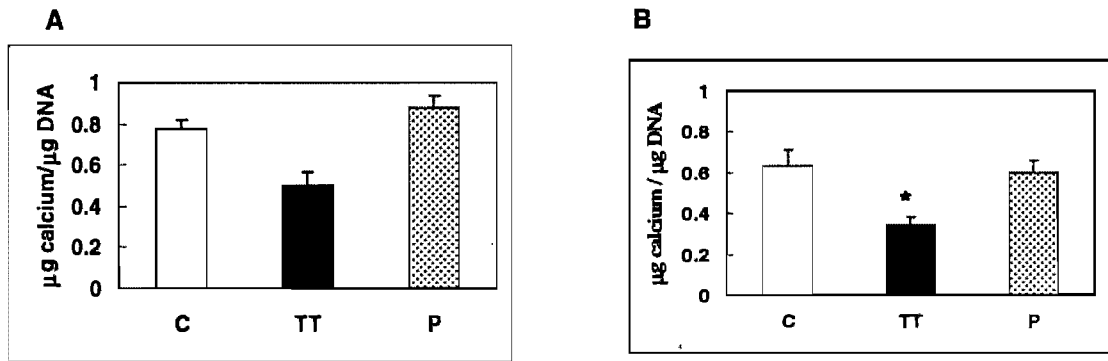


Figure 2 demonstrates that Therapeutic Touch significantly (*=p<0.03) inhibited mineralization in Saos-2 (A) and HOS(B) cultures compared to untreated (c) or placebo-treated (p) cultures measured by assaying the calcium content and expressing it per microgram of DNA to correct for any differences in cell number

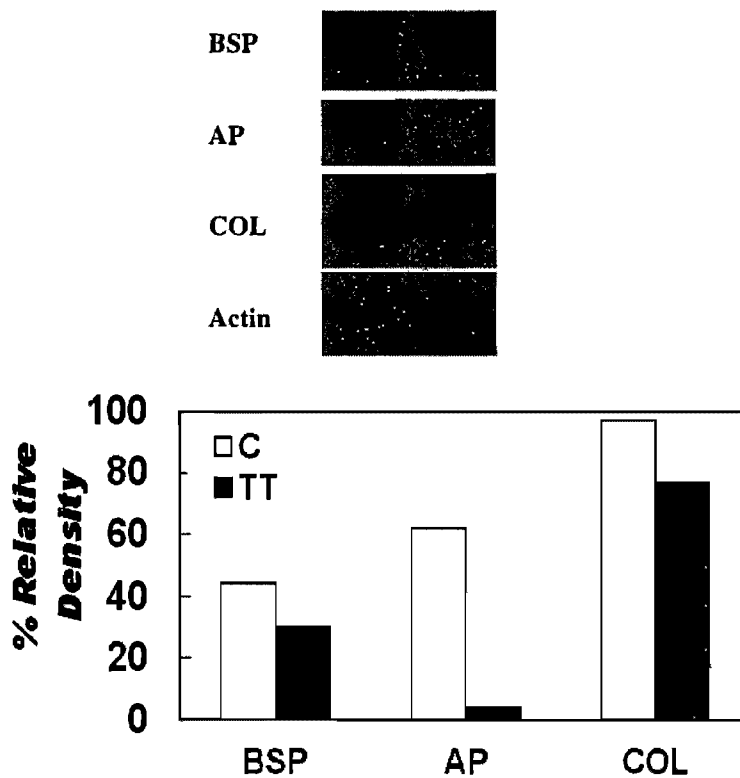


Figure 3 demonstrates that Therapeutic Touch significantly inhibited the mRNA levels of HOS bone matrix proteins; alkaline phosphatase (AP), bone sialoprotein (BSP) Type I collagen, and osteocalcin (OC), determined by Northern blot analysis. Actin served as a loading control to demonstrate that equal amounts of total RNA was loaded onto each lane and all other bands for bone matrix proteins were normalized to this standard for the graph

Tion of TT to Saos-2 and HOS cultures, BSP, AP, OC and Type I collagen mRNAs decreased compared to the control group (figure 3). Actin was used as a control to demonstrate equal loading of mRNA into each lane. Similar results were found with Saos-2 cells but were previously published ((13). This analysis of message levels for bone matrix proteins from Saos-2 and HOS correlated well with the calcium content data, showing that bone formation was decreased by TT in osteosarcoma cells.

Conclusions

Our experiments are the first to demonstrate that Therapeutic Touch treatment of human bone cancer cell lines caused a significant decrease in osteoblast matrix synthesis and mineralization, and differential effects on cell growth. These findings suggest that experienced energy medicine practitioners are able to affect cells in culture, that the practice of energy medicine may be beneficial to patients, and that this technique, derived from ancient cultures, such as Ayurveda, has scientific validity and should be studied in more depth.

Acknowledgement:

This work was supported by a grant AT00756 from the National Institutes of Health.

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