

The Effect of “Healing with Intent” on Pepsin Enzyme Activity

TONI BUNNELL

*School of Health, University of Hull
East Riding Campus, Beverley Road
Willerby HU10 6NS, United Kingdom
E-mail: T.Bunnell@nursing.hull.ac.uk*

Abstract — This study was conducted in an attempt to determine whether “healing with intent” could be shown to exert an effect on pepsin enzyme activity which, if proven, might serve to raise the credibility of healing as a bona fide therapy. The ability of healing to influence enzyme activity was chosen as a method of assessment as it eliminated the possibility of the placebo effect, which is often encountered when using human subjects. The rate of breakdown of egg albumen by a 1% pepsin solution was followed using a Jenway 6051 Colorimeter at a wavelength of 470 nm. An effect due to healing was indicated by experiments using percentage light transmission (%T) as an indicator of reaction rate. Across 20 separate trials the reaction rate of the enzyme sample “healed with intent” was found to be significantly greater than the unhealed sample ($P = 0.03$).

Keywords: healing — healer — alternative medicine — complementary medicine — bioenergy — biomagnetism

Introduction

“Healing with intent” is also referred to as spiritual healing, psychic healing, paranormal healing, hands on healing, non-contact therapeutic touch, natural healing, laying on of hands and Reiki. The effectiveness of healing has been a part of lay medicine for well over 2000 years while the search for the “healing energy” has gathered momentum in recent times.

My choice of enzymes as a tool for investigating the effectiveness of healing was determined partly by the fact that healers have been shown to produce anomalously large magnetic fields from their hands (Tiller, 1995) and that magnetic fields have been shown to alter enzyme activity (Smith, 1972).

The decision was also based on the fact that earlier studies suggested an effect of healing on enzyme activity (Edge, 1979; Rein, 1986; Smith, 1972), and that the use of enzymes in this context removes any question of the placebo effect contributing in any way to the outcome of the study. Hence, the conditions of scientific rigor necessary to grant validity to such a study are present, namely a controlled, blinded study.

Hypothesis

The hypothesis of this study is that “healing with intent” will alter the activity of the enzyme pepsin, and hence the rate at which it breaks down egg albumen. For each and every reaction the starting concentrations of enzyme and substrate are equal, temperature is held constant and optimal, and pH is non-optimal, namely greater than the optimal 1.6 for pepsin. Had the pH of the solution been optimal, the reaction would have proceeded too quickly to allow data to be collected. As the pH of the solution is non-optimal, there is scope for either an increase or a decrease in reaction rate.

It is hypothesized that “healing with intent” will alter the activity of the enzyme molecule by affecting the state of ionization of the side-chains of amino acid residues at the active site.

Method

A pilot study comprising three trials was conducted (Bunnell, 1996) and the data incorporated into this study.

The method used in the current study is as follows: The rate of breakdown of egg albumen by a 1% pepsin solution, at 40°C and a pH greater than 1.6, was followed in two test tubes using a Jenway 6051 Colorimeter, with the wavelength set at 470 nm. A wavelength of 470 nm was chosen as it is the recommended wavelength setting for a yellowish colored solution, such as egg albumen. The pepsin solution was made up from pepsin powder (Philip Harris Ltd., product no.: H06475/5) using distilled water, while the egg albumen was prepared using the following procedure.

The white of an egg was mixed with an equal volume of distilled water. The mixture was poured into 500 ml of distilled water at 60°C with continual stirring. The mixture was warmed slightly (not above 80°C) until it became opaque, allowed to cool and filtered using muslin.

The albumen solution was prepared in this manner, rather than using an industrial preparation of albumen granules, as it provided initially a more opaque solution, better suited to the monitoring of percentage light transmission (%T). As the albumen was broken down, the solution changed from being opaque to transparent. By monitoring the changes in %T with time, it was possible to determine the rate at which the reaction was taking place; namely the rate of breakdown of the substrate (egg albumen) by the enzyme pepsin.

Trials 1–19

Prior to mixing the enzyme and substrate solutions, two test tubes (each containing 30 ml of 1% pepsin solution) were treated as follows:

Test tube 1: Held in the hand by a person with reported healing abilities, *i.e.*, a trained [National Federation of Spiritual Healers (NFSH) and Reiki] healer, for a predetermined period (Healed). *Test tube 2:* Held in the hand by a person with no known healing abilities for the same predetermined period as test tube 1 (Unhealed Control).

The procedure adopted by a healer when delivering "healing with intent" to the test tube of enzyme solution held in the hand, is as follows.

The healer closes his/her eyes and relaxes into a calm, meditative state, shown to result in a higher than normal preponderance of alpha brain waves (Cade & Coxhead, 1996). This is generally referred to as "tuning in." They then focus their mind on the contents of the test tube for the allotted time, adopting the same mind-set as if they were healing a patient, a theory for how this might work being described in Bunnell (1997).

During the process of "energizing," the healer had no physical contact with the enzyme solution. The healer's hands were separated from the solution by the glass of the test tubes containing it.

Previous studies conducted by other researchers, to test the effect of the exposure to a healer's hands, generally involved similar use of a control whereby an identical procedure to healing was followed but with a "lack of intent to heal." This situation could be established by mimicking the actions of the healer while simultaneously counting down from 100 in intervals of 7, thus preventing the mimicking "healer" from attaining the alpha brain wave state reputed to be necessary for successful healing to take place (Quinn, 1984).

It was decided to allow an unaware subject to hold the *Unhealed Control*, in a room separate to both the healer (while healing the enzyme) and the laboratory where the experimental procedure was carried out. With no knowledge of the existence or nature of the experiment being conducted, it was assumed that the person would not be delivering "healing with intent" to the enzyme solution in the test tube, either intentionally or otherwise.

Following the period during which the two test tubes were held in the hand, the temperature of the enzyme solution in both test tubes was recorded, and in both cases it was found to be 33°C. It was considered important to record the temperature of the enzyme solution in both test tubes following the holding period, and the pH of the solutions after mixing the substrate with the enzyme, as both temperature and pH are environmental factors known to exert an effect on enzyme activity. In order to ensure that any effect observed, regarding enzyme activity, was due to exposing the enzyme to "healing with intent," it was important to reduce the confounding variables to a minimum. To this end, for each and every trial, the starting concentrations of enzyme and substrate were equal, and temperature and pH were held constant.

The two test tubes containing the enzymes were then coded (using signs drawn on the test tubes with a chinagraph pencil) by someone with no interest in the experiment. The code was only broken after the experimental procedure was completed and the data recorded and analyzed. This enabled the data to be recorded blindly by the experimenter.

One milliliter of pepsin solution was removed from each of the test tubes and placed in two other test tubes, retaining the coded labeling of the *healed* and *unhealed* samples. These were then placed in a water bath at 40°C for 10 min to allow the enzyme solution to equilibrate to the same temperature. Two test tubes, labeled identically to the coded test tubes containing the enzyme,

were each filled with 5-ml albumen solution and then placed in the water bath for the same 10-min period and allowed to equilibrate. At the end of this 10-min period the 1-ml samples of pepsin solution were added to each of the two test tubes containing the albumen solution and the recording of data commenced.

Trials 1–8

- Holding time of healed and unhealed enzyme samples = 15 min.
- pH of solution following mixing of pepsin enzyme and albumen = 5.0.
- Temperature of *healed* sample following the 15-min holding period = 34.0° C.
- Temperature of *unhealed* sample following the 15-min holding period = 34.0° C.

Trial 8

For this trial alone, the *Unhealed Control* was replaced by an *Untreated Control* which was placed in a water bath maintained at 33°C for 15 min prior to incubation of enzyme with substrate, to allow it to reach the same temperature as the *healed* enzyme sample following 15 min of being held in the hand.

- pH of solution following mixing = 4.0.
- Temperature of *healed* sample following 15-min holding time = 33° C.
- Temperature of *untreated* sample following 15 min in a thermostatically controlled water bath = 33° C.

Trials 9–19

The methodology was identical to Trials 1–7, with one exception, namely that the holding time was reduced from 15 min to 5 min.

- Temperature of *unhealed* control following 5-min holding period = 31° C.
- Temperature of *healed* sample following 5-min holding period = 31° C.
- pH of solutions following mixing: Trial 9: pH = 3.4; Trial 10: pH = 2.9; Trial 11: pH = 2.9; Trials 12–19 : pH = 3.1.

The decision to reduce the time of exposure to a healer's hands from 15 min to 5 min was made, as a study conducted by Rein (1986), (whereby Matthew Manning, a renowned British healer, was shown to significantly alter the variability of the enzyme monoamine oxidase), chose to use 5-min healing periods, with a successful outcome. (The treatment effect varied substantially from trial to trial, presumably due to changes in Matthew's performance.)

Further, the systems analyst Laszlo (1997) is also of the firm opinion that

exposure time, and indeed distance from the organism/system receiving the healing, are of no importance.

Trials 20–23

The enzyme solutions used in Trials 18 and 19 were used to repeat the experiments twice, 24 h after the healing procedure and original analysis had taken place. The reason for conducting these extra experiments was to see if the effect/charge conferred on the enzyme sample, by its exposure to the hands of a healer, was still present after 24 h as one study (Miller, 1976) suggests that it would not be. In this instance, the enzyme solutions were left in open test tubes in the lab at ambient (room) temperature (20°C).

- pH of solutions following mixing = 3.2.

No difference in reaction rates was observed between *healed* and *unhealed* samples.

Results

The reaction rate for each trial ($\Delta\%T/\Delta t(\text{min})$) was determined using the steepest part of the slope for each individual graph, portraying %T against time, obtained for *healed* and *unhealed* samples for each trial. As temperature and pH were held constant within each trial, the only variable was the delivery of "healing with intent" to the *healed* sample. The reaction rates thus obtained for each trial provided 19 sets of paired data depicted in Table 1 and Figure 1.

The paired *t*-test was used as the mode of statistical analysis and the resulting probability found to be statistically significant ($P = 0.03$), where the *healed* enzyme samples were more active than the *unhealed* samples.

Table 1 also shows the differences (expressed as a percentage) between reaction rates of *healed* enzyme samples compared with *unhealed* samples, a positive value indicating a greater rate for the healed as compared with the unhealed samples.

Discussion

For all trials the pH of the final solution (enzyme and substrate mixed) was more alkaline than the optimum pH of pepsin which is 1.57. It was considered essential to work with a solution of non-optimal pH, as far as the enzyme pepsin was concerned, as one could not hope to produce any change in reaction rate in an enzyme-controlled reaction where all the required experimental conditions are already at an optimum. Hence, maintaining a non-optimal pH, while keeping all other parameters optimal, would allow any effects caused by

TABLE 1
Reaction Rates for Healed and Unhealed Samples and % Differences Between Them

Trial	Healed Sample Reaction Rate	Unhealed Sample Reaction Rate	% Difference: Healed: Unhealed
1	3.41	1.99	+71.36
2	3.04	2.67	+13.86
3	2.79	1.53	+82.35
4	4.40	4.13	+0.07
5	4.00	4.53	-13.25
6	5.00	4.80	+4.17
7	5.20	5.20	0.00
8	0.37	0.30	+23.33
9	0.90	0.83	+8.43
10	4.00	3.93	+1.78
11	3.93	3.87	+1.55
12	3.47	3.40	+2.06
13	3.67	3.40	+7.94
14	4.50	4.10	+9.76
15	3.67	3.53	+3.97
16	3.60	3.60	0.00
17	3.60	3.60	0.00
18	3.53	3.47	+1.73
19	3.60	3.47	+3.75

Total % differences between healed and unhealed samples = 222.86 where healed sample is more active than unhealed. 222.86 divided by 19 (no. of trials) = 11.73%. That is, averaged over all 19 trials, healed samples of enzyme are 11.73% more active than unhealed samples.

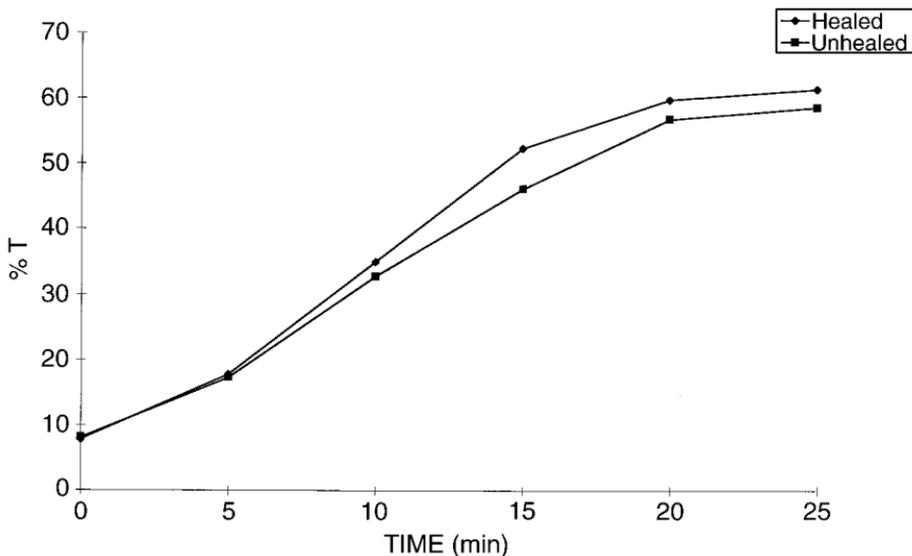


Fig. 1. % T/Time (min) averaged for healed and unhealed enzyme samples for all 19 trials.

the "healing" process to be observed, the assumption being made that healing will exert an effect by altering the pH of the enzyme solution.

As the *healed* and *unhealed* samples were found to produce a significantly different reaction rate across Trials 1–19 ($P = 0.03$), it would seem that "healing with intent" is producing an observable effect on the activity of pepsin enzyme.

In order to avoid any accidental delivery of "healing with intent" (as all people are purported to have an innate healing ability) any trials involving an *unhealed* sample engaged the services of people who were not informed of the nature of the experiment, and merely asked if they would hold a test tube for 5/15 min. Even if an unwitting healer had existed amongst the non-healers, this would merely have served to lessen any differences observed between the activity of *healed* and *unhealed* enzyme samples.

Where *healed* and *unhealed* samples were kept at room temperature for 24 h, following the procedure as for Trials 20–23, no observable difference resulted when the enzyme samples were added to albumen solution and the reactions monitored as for earlier trials. It would appear, then, that any effect/charge conferred on the enzyme molecule during "healing with intent," disappears within 24 h in an *in vitro* situation.

Previous Research

Smith (1972) tested the ability of Oskar Estebany, a healer, to stimulate by the laying on of hands, the activity of the enzyme trypsin as measured by its action on a known substrate *in vitro*. During a three-week period, consistent and statistically significant stimulations of enzyme activity were obtained by Oskar Estebany by means of the laying on of hands.

Rein (1986) carried out a study intended to further investigate the mechanism of the action of bio-pk (bio-psychokinesis being taken as being synonymous with "healing with intent" in this context) at the molecular level. He stated that since previous studies (Edge, 1979; Smith, 1972) showed enzymes to be specific biochemical loci for pk effects, it was of interest to determine whether an enzyme would respond to pk if maintained in its physiological environment using naturally occurring substrates. As mentioned earlier, Matthew Manning, a British healer, was shown to alter significantly the variability of the enzyme monoamine oxidase, by holding test tubes containing solutions of the enzyme.

Healers have been shown to produce 70-V surges of electricity from their hands (Tiller, 1995). They have also been shown to produce 0.3–30 Hz pulsing from their hands during "healing" (Zimmerman, 1985).

During the delivery of "healing with intent" towards the enzyme molecules dissolved in distilled water, it is possible that an electrostatic charge is conferred on the molecule which might specifically affect the degree of ionization of acidic and basic groups at the active center of the enzyme. This in turn would affect the activity of the enzyme. If such a charge were conferred

on the enzyme molecule, dissipation over 24/48 h would not be unexpected (see Trials 20–23).

It has been shown by Miller (1976) that any charge conferred on an enzyme solution, using either magnetism or healing, will automatically be discharged during the following 24 h.

These effects were enhanced when the enzyme was stirred vigorously in a metal container. Work carried out on enzymes using magnets has demonstrated similar effects to those of healing (Smith, 1972). However, magnetism does not appear to be the whole story as disproportionately large magnetic fields were needed to create the same effect as a healer, where the magnetic field produced by the hands was found to be a fraction of the artificial magnetic fields needed (Smith, 1972; Zimmerman, 1985).

Benveniste (1988), in his paper on high dilution experiments, mentioned the possible part played by electrical or magnetic fields in the memory of water. He stated that “a low frequency alternating magnetic field was found to erase the memory of water. The potency of the dilutions disappeared after the physicists had submitted them to this field, although it remained intact in untreated dilutions which had traveled back and forth between the two laboratories but had not been exposed to the field.”

Rein and McCraty (1994) showed that water altered by subtle energies (thought to be involved in the healing process) is called structured water and is different from ordinary water. It has less surface tension, is more acid, and has an altered spectrum-absorption pattern. The water immediately surrounding the cell membrane in the body is structured unlike the rest of the body’s fluids. Rein discovered that he could make cells grow faster or slower depending upon how he structured the water. Certain frequencies accelerated cell growth but when he added other frequencies on top of them it inhibited cell growth.

The results also suggested that the water structured in the experiments facilitates the spontaneous tendency of DNA to rewind. These studies are an extension of previous research indicating that water structured with bioenergy alters the growth of plants and mammalian cells in culture. Results from these experiments also extend previous findings which observed characteristic changes in the infrared (IR) spectra of water exposed to bioenergy from healers.

In experiments conducted by Pyatnitsky and Fonkin (1995), water used was kept at a constant temperature for about two hours before the experiment was started. The human operator took their place about a meter from the container. They were then asked to influence the water structure.

The data obtained suggests that certain human operators can produce a consciousness-related influence on water structure when other parameters are held constant. The results of such human influence do not depend on water temperature and pressure which further validates the fact that operator effort is the dominant factor in the observed change. Not all operators produced changes that can be distinguished from their background fluctuations. This finding agrees with other studies which showed that not all healers produce a signifi-

cant effect. Dean and Brame (1975) also studied healer-held water with IR spectrophotometry. Calorimetric measurements were consistent with altered hydrogen bonding. Dean also observed that the water effects may represent something other than altered hydrogen bonding because the effects were sometimes carried over to a distillate, which would not be expected if they were due to hydrogen bonding alone.

Using infrared absorption spectrophotometry, Grad (1967) discovered that the bond angle of the water molecule had undergone a subtle but detectable shift following exposure to a healer's hands. Because the healer-induced changes in the normal bond angle had caused a slight alteration in the way molecules were able to align themselves in solution, hydrogen bonding was found to be indirectly affected.

Miller (1977) has been able to confirm experimentally Grad's discovery that healers are able to disrupt hydrogen bonding in water. In addition, treatment of water by several healers was found to produce significant reductions in surface tension.

Summary

Using data from 19 trials, "healing with intent" has been shown to influence pepsin enzyme activity ($P = 0.03$).

Considering a mode of action, it is possible that a pulsing magnetic field within the range of 0.3–30 Hz or 70 V pulses of electricity, emitted from the hands, *etc.*, during the delivery of "healing with intent," might produce resonance of particles in the air (much as light and sound require particles to allow them to be carried as traveling waves). Delivery of a magnetic field in close proximity to the enzyme solution might reasonably be expected to result in transmission of a weak electric current through the enzyme solution. The latter would be made possible due to a combination of charged protein molecules (ions), which act as semiconductors, short-range electrostatic forces between water molecules and long-range *Van der Waals forces*. Alternatively, the pulses might produce electromagnetic waves (outside the e.m.f. spectrum as it is currently known), which can travel in a vacuum. Whichever the mode of transmission of the pulses, it is conceivable that they will create resonance or an electric charge in the water in which the protein enzyme molecules are dissolved and with which they are intimately associated.

It can be speculated that the delivery of "healing with intent" confers a charge on the protein molecule, which affects the state of ionization of the side-chains of amino acid residues at the active site. Such a charge would appear to dissipate over a 24-h period in a non-living system such as a test tube of enzyme solution. This occurs as such a system does not possess the mechanism operated by living cells whereby 60% of all metabolic energy is used to maintain the polarity across the cell (Alberts *et al.*, 1989).

Conclusion

The delivery of “healing with intent” to samples of pepsin enzyme would appear to alter significantly the activity of the enzyme ($P = 0.03$), in reactions where the pH is less than optimal, and where pH and temperature have been held constant. Whether the healing influence is due to the production of low frequency pulses from the hands, from other sources such as the pineal gland, or even non-local responses unaffected by space and time, is open to speculation.

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