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EFFECT OF CONSCIOUS INTENTION ON HUMAN DNA

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I. INTRODUCTION

Mind-body medicine has well recognized the ability of mental images, generated by the mind and directed to specific parts of the body, to produce profound physiological changes, e.g. impede tumor growth (Ader, 1981). Psychoneuroimmunologists, however, do not recognize that the mind can also intentionally focus on and manifest changes in biological systems outside the body.

The effects of focused intention have nonetheless been studied using both physical (Jahn and Dunne, 1986) and biological systems (Braud, 1989), and is often referred to respectively as psychokinesis (PK) and Bio-PK. A parallel investigation of conscious intention on biological systems falls under the auspices of healing research where investigators have demonstrated that various types of healers can produce biological effect (Benor, 1990). A third line of investigation involves the study of Chi-Gong practitioners who can also influence biological systems. Most of these studies, however, are phenomenological and are only intended to demonstrate an energetic communication between the practitioner and the biological target. In most healing experiments the intention of the practitioner is to “heal” or normalize the pathological situation.

A few studies, however, have addressed the question whether different intentional states of consciousness produce different biological effects. For example, Rauscher and Rubik examined the relationship between biological responses and different healing state of consciousness (Rauscher and Rubik, 1983). These experiments were designed to determine whether the healer could protect bacterial cells in culture from inhibition induced by an antibiotic (ampicillin). Using different intentions Laskow could either protect bacteria from the lethal effects of antibiotics or inhibit their growth in the absence of antibiotics.

Sweet and Myers of Spindrift compared two different healing states of consciousness, goal directed and qualitative (Sweet, 1991). Since qualitative healing, as they characterize it, is the surrender of one’s will to the will of God, there is no focused intention as in goal-directed healing. These different states of consciousness produced different biological effects on the growth of yeast and seeds.

II. ORIGINAL EXPERIMENTAL DATA

A. EFFECTS OF INTENTIONALITY ON DNA SYNTHESIS IN CULTURED TUMOR CELLS

The first experiments conducted by the author (Rein, 1992) were intended to study and compare the biological effects of different images, thoughts and intentions. The growth of tumor cells in culture was chosen because it could be monitored quantitatively using state of the art biochemical techniques and was highly relevant clinically. The protocol involved measuring DNA synthesis by quantifying it’s ability to incorporate radioactive thymidine using standard biochemical techniques. The rate of DNA synthesis was determined relative to the total number of cells which were counted in a hemocytometer. The healer, Leonard Laskow attained different states of consciousness and intentionally focused on three petri. Aliquots of he same population of cells were simultaneously presented to a non-healer in an adjacent

room. The non-healer was reading a book to minimize the interaction of his consciousness with the cells. Both sets of petri dishes (n=6) were brought back to the tissue culture hood where they were labeled blindly. The author then treated all the petri dishes with radioactive thymidine and processed them after 24 hours of additional growth. DNA synthesis was measured using standard biochemical techniques which involve counting the amount of radioactivity incorporated into the DNA molecule (a measure of DNA synthesis) using a scintillation counter.

Five different mental intentions were studied for their biological activity. Laskow describes an overall state of transpersonal unconditional love that was maintained throughout all the experiments, which allowed him to be in resonance with the tumor cells. The technique used for attaining these healing states of consciousness is a form of meditation which allows intentional focusing and cohering of energy. Laskow refers to these intentions as different contents of consciousness. He distinguishes the intentions as follows:

1) returning to the natural order and harmony of the cell's normal rate of growth, i.e., before they were transformed to tumor cells;
2) circulating the microcosmic orbit;
3) letting God's will flow through his hands, i.e., a transpersonal intention;
4) unconditional love, ie. no specific direction to the energy was given;
5) dematerialization into the light and/or dematerialization into the void.

The results from this study indicate that the different intentions could be distinguished in terms of their biological responses. Three intentions inhibited the growth of the tumor cells, the most effective (39% inhibition) being to return the cells to their natural order. Allowing God's will to manifest appeared to be only half as effective (21% inhibition). Under the same experimental conditions, unconditional love had no effect. Thus some intentions were more biologically active than others, although the order of efficacy may be dependent on the specific target.

By changing the thought and image content of a given state of consciousness, it was possible to distinguish these parameters from intentions. The results indicated that different biological effects could be observed by just changing the intent or the imagery associated with the healing process but non-focused thought had no effect. Thus, while Laskow was in the microcosmic orbit state of consciousness, the mental image of visualizing only three cells remaining in the petri dish after the experiment caused an 18% inhibition of cell growth. On the other hand, switching the mental image to one where many more cells were visualized in the dish resulted in an increased growth of tumor cells (15%). The results are remarkable since not only could a different biological response be observed by changing the mental image, but an actual reversal of the biological process of cell growth was achieved.

By concentrating on returning the cells to their natural order, while holding no visual image, intention could be separated from imagery. This experiment demonstrated that intention produced the same 20% inhibitory effect as did imagery alone. On the other hand, when the image of few cells in the petri dish was combined with the intention for the cells to return to their natural order, the inhibitory effect on cell growth was doubled to 40%. These results therefore suggest that imagery and intent each contributed equally to inhibiting the growth of tumor cells in culture and that their effect is additive when combined together.

These results indicate that focused human intention can influence the growth of tumor cells by modulating the rate of DNA synthesis. The effects observed here on DNA synthesis were shown to be dependent on the intention of the healer with some intentions producing larger effects and others producing effects in

the opposite direction. It was also demonstrated that imagery as well as intention was a critical component of the states of consciousness which produced biological effects. Underlying all the states of consciousness tested was a genuine heart-felt feeling of unconditional love which Laskow felt was necessary in order to produce the observed effects on DNA synthesis.

B. EFFECT OF INTENTIONALITY ON THE CONFORMATION OF THE DNA HELIX

1. Love and Coherent Bio-fields

Although specific intentional states were studied in the experiments described above, an underlying state of unconditional love was continuously maintained. The physiological effects of love and other positive emotional states has received relatively little attention in the biomedical community, although a few psychoneuroimmunologists have studied its beneficial effects on immune enhancement (McClelland and Kirshnit, 1988; Knapp et al., 1992). The possibility that such effects might be energetically mediated has been considered, although now direct measurements of the body's electromagnetic (EM) fields have been made while individuals are experiencing positive emotional states. However, researchers at the Institute of HeartMath (IHM) have demonstrated that there are characteristic ECG patterns associated with positive emotional states which were measured as coherent frequency transforms of time domain ECG traces and heart rate variability measures (McCraty et al, 1995). Since individuals generating such coherent ECG patterns also showed enhanced immune systems (Rein et al, 1995b), it was proposed that the coherent EM field radiating from the heart of individuals in the state of love is responsible for maintaining homeostasis and promoting health in general (Paddison, 1992). It was further postulated that these physiological changes were mediated by DNA (Paddison, 1992; Rein and McCraty, 1993c) which acted as an antennae for the energy fields of the heart (Rein and McCraty, 1993a, 1994). In this way specific intentions, carried by the coherent bio-field of the heart, can transmit information to local biochemical reactions inside the cell.

Although psychoneuroimmunologists do not consider mind body effects to be mediated by endogenous (internal) EM fields, the existence of such fields is well acknowledged by the scientific community since EEG and ECG measurements indicate the existence of endogenous bio-fields generated by "electrically excitable cells" in the brain and the heart. There is even some experimental data indicating the coherent nature of these bio-fields (Frohlich, 1988; Popp et al, 1981, Ho et al, 1992). Although these bio-fields are not usually considered to regulate the natural healing process, such a function has been considered (Popp et al, 1979). Popp believes coherent bio-fields are generating from light emitted from DNA, since his experimental data indicates DNA is capable of emitting coherent photons (Rattemeyer et al, 1981). This hypothesis is supported by a recent observation that the DNA molecule itself oscillates coherently (Gariaev et al, 1992) and would therefore generate a coherent EM field. However, the observation that DNA oscillates coherently is also consistent with the hypothesis that DNA is sensitive to externally applied coherent EM fields. This hypothesis is also supported with the fact that DNA is known to respond to ordinary EM fields (Sakamoto et al, 1980) and that quantum fields enhance DNA synthesis (Rein, 1991) and might therefore be sensitive to coherent fields.

2. Experiments Indicating Coherent Bio-fields from the Heart Effect DNA

In order to test the hypothesis that coherent bio-fields from the heart resonate with and modulate the DNA molecule, a series of experiments were conducted at the Quantum Biology Research Lab and at IHM using isolated human DNA in an aqueous solution (Rein, 1992; Rein and McCraty, 1993a, 1993b, 1994; Rein, 1995a). By removing the DNA from the body and placing it in a beaker in front of an individual intending to change the DNA, it was possible to measure a direct energetic link between heart focused

intention and the DNA molecule without intervening chemical signals from the nervous system within the body.

Although human DNA was used in these experiments, it was a pooled sample from the placenta of many individuals. It is likely that even larger effects would be seen if the subject was directing their intention to their own DNA. In contrast to the previous experiments described above which measured DNA synthesis, these experiments measured the winding and unwinding of the two strands which make up the DNA helix: also referred to as conformational changes in the secondary structure (helix) of DNA. Although these experiments were conducted on isolated DNA, winding and unwinding are properties of DNA which occur in the body. Unwinding of DNA preceeds cell division and winding of DNA is associated with DNA repair.

An UV Spectrophotometer (from Hewlett Packard) was used to measure the winding and unwinding of DNA. This is a standard biochemical technique based on the absorption of UV light at 260nm. It was demonstrated that DNA in deionized water (20μg/ml) was stable when kept at room temperature for two hours. Absorption values were calculated as a percent change relative to the initial value at the start of a given experiment. Control values (no treatment) gave values around 1.1 %, whereas treated samples varied from 2-10% indicating at least a two-fold effect on the DNA.

Initial experiments were done with Leonard Laskow who used a combination of directed intention, unconditional love and specific imagery of the DNA molecule at the molecular and atomic level often focusing on the hydrogen bonds which hold the two strands together. These experiments revealed that different intentions produced different effects on the DNA molecule causing it to either wind or unwind.

These results were later confirmed in an extensive series of experiments done at IHM. ECG recordings were taken when ordinary subjects (not gifted healers) used the Freeze Frame technique (Childre, 1994) to generate positive emotional states and focus their intention on the DNA molecule. In this way is was possible to make a direct correlation between ECG coherence and changes in the winding or unwinding of the DNA helix. Individuals generating ECG coherence were able to either wind or unwind the DNA depending on their intention. It appeared that the more ECG coherence the better able were the individuals to resonate and change the DNA, although a quantitative correlation between these parameters could not be made. Individuals generating more usual incoherent ECG patterns were typically unable to effect the DNA, although one individual who was particularly agitated (and had a very incoherent ECG) produced an abnormal shift in the UV.

In one experiment a DNA sample was placed in front of individuals generating coherent ECG patterns. Although the subjects were aware this was happening, they were previously instructed to continue focusing on their heart and not to focus their intention on the DNA. In this case, no changes in DNA conformation were observed. Although these experiments are preliminary, they suggest that the coherent field generating from a loving heart by itself is not sufficient to change DNA and that a specific intention is required to direct the heart field. Specific intentions may therefore be considered as frequency modulations of the energy fields of the heart, giving direction to these energy fields to heal a specific organ, cell or biochemical pathway.

Further experiments at IHM with Lew Childre, a particularly gifted individual capable of generating strong ECG coherence for extended periods of time, indicated some interesting properties of focused heart intention. In one experiment, Childre was able to direct three different intentions to three separate samples of DNA placed in front of him. One DNA sample showed a small change in its conformation, the other showed a very large change and the third sample was unaffected. These results indicate that

intentions can be directed and localized to a specific target (in this case a specific sample). Such a conclusion is similar to previous work by the author working with the British healer, Matthew Manning who was able to influence to adhesion of tumor cells to collagen by directing his intention to only one petri dish in a stack of four. In addition to specificity the experiments presented here demonstrate a new property of human intention. According to Childre his intentions were sent simultaneously suggesting the possibility that we can frequency modulate the energy field of the heart with several frequencies (corresponding to different intentions) at the same time. In this way we could simultaneously send heart energy to heal a weak liver and a sprained ankle.

Another interesting experiment with Childre indicated that he could influence the DNA at distances of approximately 0.5 miles (Rein and McCraty, 1993b). In these experiments he was notified by a portable telephone when the DNA sample was placed on the laboratory bench. After the specific intentions were sent, the experimenter was notified and the samples analyzed. In some cases the DNA was caused to wind up, in other cases it unwound and in some cases there was no effect. In each experiment the measured effect (or lack of effect) correlated with Childre's intention. In this way the experiment was done blind, since the experimenter did not know what intention was being sent during a given experiment. These results also demonstrate that although coherent heart energy has an electromagnetic component which can act locally within the body, it also has a non-electromagnetic component which is able to carry specific information over long distances. Of course it is well known that healers can project their energy and heal someone thousands of miles away.

In fact one such experiment was conducted with DNA using a healer in Russia (Moscow) who intended to effect the DNA samples in California. Valerie Sadyrin had previously been to the lab in California where he had demonstrated his ability to influence the conformation of DNA over short distances (Rein, 1995a). Upon Sadyrin's return to Russia a specific 30 minute block of time was predetermined when he would send healing energy to influence the DNA. Immediately prior to that time a sample of DNA was measured for its pre-treatment value and allowed to sit on the laboratory bench. After the 30 minute period the sample was remeasured and compared with the changes that occurred in the control sample of DNA in the next room. This exact procedure was then repeated a week later. In one of the experiments, the treated DNA sample did in fact show increased winding, although no changes were seen in the second experiment. Nonetheless these results are consistent with those of Childre and indicate the non-local sensitivity of DNA to intentions sent over very long distances. These results are in turn consistent with those of other investigators measuring non-local effects of healers (Dossey, 1989).

Additional studies with a variety of healers, including Barbara Luetgebrune of Santa Barbara, CA and Hank Adams of El Cerrito, CA, have been conducted verifying the effect of conscious intention on the conformation of human DNA. Adam's Ki -Neural Integration (KNI) technique, based on Native American prayer, brings God's energy into the consciousness (or inner spark) of the DNA.

Although the techniques used by the different healers is quite varied they all appear to require a heart focus. Although ECG coherence was not measured in most of these studies, at least two healers using very different techniques were able to generate ECG coherence and could influence DNA. These techniques are in turn different from the techniques used at IHM to generate ECG coherence. It is therefore possible that only healers capable of generating ECG coherence, or at least generating genuine unconditional love, will be able to resonate with the DNA molecule and intentionally and specifically modulate its structure. This hypothesis is supported by an experiment with one healer who was able to do "mental healing" as well as heart-based healing. In one experiment comparing these different states of intention it was observed that only the heart-based intention was effective at altering the conformation of DNA. Some healers could influence the DNA, although they could not intentionally direct

it to either wind or unwind. Other healers could influence the DNA on certain days and not others. These results may be consistent with the hypothesis stated above if they were generating only weak coherence in their ECG.

Further insight into how different healers effected DNA was obtained by measuring the changes in conformation over time (Rein, 1995a). In the experiments described above the conformation of DNA was measured immediately after being exposed to individuals in different intentional states of consciousness. In some experiments the DNA was measured at fifteen minute intervals for an additional two hours after treatment. Depending on the intention a variety of kinetic patterns were observed. In some cases the effect lasted for the entire two hour period, whereas in other cases the effect lasted for only fifteen minutes. Most interesting was the observation that occasionally the DNA didn't show a response for the first 30-60 minutes, but changed after that. Such a time delay in reading the information in the environment could be due to a weaker or less coherent intention which took a certain amount of time to resonate with the DNA molecule.

In analyzing the results from these studies it is important to understand that the energetic effects of heart-based intentions may manifest physically in the DNA molecule in many different ways. Even conformational changes can manifest differently. Traditionally, winding and unwinding of DNA is measured by changes in the absorption of UV light which occur only at the specific frequency (wavelength) of 260nm (see Figure 3). In some of the experiments described above changes at other wavelengths, notably 310nm, were also observed. These results have been described elsewhere in detail (Rein, 1995a) and indicate that in some cases the effect of human intention on DNA was more than just winding and unwinding of the two strands which make up the helix. From a traditional scientific point of view these experiments are anomalous, but are interesting since they suggest that intentions affect our DNA in a unique manner.

C. EFFECT OF INTENTIONALITY ON THE ELECTRICAL PROPERTIES OF DNA

The electrical properties of DNA in solution were assessed by measuring the flow of current between two gold electrodes forming an anode and a cathode. The conductivity of the aqueous solution (0.5% NaCl or deionized water) was modulated by the presence of the DNA since ions bound to the outside or inside of the helix can be release and a free to move toward the electrodes. Depending on the charge of the liberated ions they will either enhance or inhibit the flow of the current imposed on the system from the cathode. Therefore this setup is indirectly measuring the charges on the DNA molecule itself, especially in the situation where deionized water is used since the only ions in the system will be those generated from the DNA molecule. The electrical signal detected at the anode was amplified and stored in a computer so real time traces could be observed. In addition to DNA, some experiments also used living human skin cells (grown in tissue culture) which were measured for their electrical activity at the same time as the DNA (using a split screen).

These experiments were done at IHM in collaboration with Cleve Backster using the methodology he originally used in measuring the energetic communication between plants (Backster, 1968) and which was later modified to measure long distance communication between astronauts and their own leukocytes (cells obtained from the mouth cavity) (Backster, 1985). Therefore this methodology is known to detect subtle energies (beyond conventional EM fields) which travel long distances (see below).

Three experimental protocols were used in these experiments:

1) the experimenters sat at the far side of the laboratory and engaged in normal conversation.

2) three experimenters used the Freeze Frame technique to focus on their heart and send love to the DNA.

3) a healer, Melon Thomas from Santa Cruz, CA, directed his consciousness to the DNA while holding different intentions.

The results of these experiments indicated that the Backster effect can also be used to measure electrical signals from subcellular components, eg. the DNA molecule. This conclusion was subsequently verified by independent testing in Backster's lab. In fact the type and magnitude of the electrical signals observed from DNA were similar to those Backster previously obtained from plants, bacteria and freshly isolated human leukocytes and were also similar to the signals obtained in these experiments from human skin cells grown in tissue culture. Thus it is possible that the energetic communication between humans and plants, the Backster effect and between humans and their own cells may be mediated by DNA.

As previously observed by Backster for leukocytes (Backster, 1985), human DNA responded to conscious intentions in real time with a variety of electrical responses. The most obvious responses were the presence of either positive spikes or negative spikes.

These responses indicated a dynamic system which was constantly changing, sometimes showing positive spikes and other times showing negative spike. The time internal between different spikes also varied widely ranging from seconds to several minutes with no responses observed in between, ie. a flat baseline. Different types of spikes were also observed. In addition to strength (amplitude) and direction (positive or negative), they varied in shape. Some spikes were sharp and short in duration (msec), whereas others had broad peaks and were sustained for several seconds. As mentioned above the direction and amplitude of the spikes can be accounted for by the presence of positive or negative ions appearing at the anode. However, the different shapes of the spikes can not be readily explained by traditional electrochemistry. These results therefore suggest that some anomalous electrical behavior of DNA is being measured in response to human intentions.

The wide range of dynamic electrical responses of DNA was most frequently noted when the experimenters were engaging in normal conversation. However, even when Thomas was focused on a specific intention, the DNA response was also varied. These results suggest that in responding to a specific intention, DNA may go through a sequence of different changes. Since it is difficult for most people to recreate the exact same state of consciousness when repeating the same intention, it was not possible to make a direct correlation between a specific intention and a specific electrical pattern. Nonetheless it was noted that when the experimenters were discussing highly charged emotional subjects and all the participants were excited particularly large amplitude spikes were observed. Another repeatable pattern also emerged in experiments where love was sent to the DNA. In this situation the number and amplitude of the different signals always substantially reduced.

Although the electrical response of DNA to conscious intention is complex, it is specific. The specificity of the response was determined by simultaneously measuring DNA and skin cells at the same time. These experiments indicated that certain intentions produced a response in the DNA and no response in the cells, whereas other intentions effected the cells and not the DNA. For example when the group discussion focused on genetic engineering or the AIDS issue, the DNA responded but the cells did not. On the other hand discussions about nutrition and diet produced changes in the cells and not the DNA. These results are similar to the previously described experiments where specific intentions could be

directed to different DNA samples, but also imply that in focusing our consciousness to heal a particular part of the body we need to choose the correct intention. The results also suggest that several different intentions would be more efficacious in bringing about the healing of a particular system. For example in the case of diabetes one might direct the DNA to more insulin and direct the cell membrane to modify glucose uptake.

III. DISCUSSION

1. Can Conscious Intention Effect the Genetic Code

The results from the experimental data presented above indicate conscious intention can influence DNA replication, the conformational states of the DNA helix and the electrical properties of DNA. The implications of this research are profound when one considers the possibility that we might also be able to consciously change the primary structure of DNA - the genetic code itself.

It is well established in the molecular biology community, but unknown the most people, is the fact that the primary structure of DNA does actually change (Hartman, 1975; Wintersberger, 1991). We are therefore not necessary stuck with the genetic blueprint passed down to us from our parents. Changes in the chemical structure of the individual bases which make up the genetic code are known to be triggered by certain external influences, such as chemicals or UV light. These changes are considered to damage the DNA and are therefore referred to as genetic mutations. Changes in the genetic code can also be brought about by the movement (or translocation) of individual bases from one position on the DNA molecule to another (Paulson, 1985). This type of environmentally induced genetic alteration is often referred to as spontaneous since molecular biologists do not know what causes the bases to change position. Although it has not been experimentally demonstrated, it is possible that conscious intention could alter the genetic code by directing the movement of the bases.

It is also well established by the molecular biology community that a relationship exists between the primary structure and the secondary structure of the DNA (the helix) and its conformation (Marko and Siggia, 1994a; Rennie, 1993). These new findings add credibility to the hypothesis that the ability of human intention to modulate the secondary structure (winding and unwinding of the helix) of DNA may result in some modification of the genetic code despite the fact that this has not been experimentally demonstrated. Of course it must be remembered that the experimental data described above was done in isolated human DNA in a test tube and it not clear whether similar changes will also occur to DNA in its natural environment in the nucleus of the cell.

In addition to having a primary and secondary structure, DNA also has a tertiary structure. This refers to the ability of the DNA helix to fold on itself. If the helix is like a piece of string one can readily visualize the string randomly clumped together in a wad or neatly wound around a sphere or a tube. It has recently been discovered through the use of modern advances in electron microscopy that the DNA helix can actually fold on itself and form what is called “higher order structures” (like our strip wound around a tube) (Marko and Siggia, 1994b). Even more surprising is the types of higher order structures DNA can in fact form. By now it is well established that one of the higher order structures of DNA is the toroid (Bloomfield, 1991; Hud et al, 1995; Ubbink and Odijk, 1995).

The molecular biology community has not yet discovered the function of these higher order structures of DNA, although they have recently acknowledged that this tertiary structure is functionally significant and that there is a complex relationship between the tertiary structure and the secondary structure (the helix) and the primary structure (the genetic code) (Marko and Siggia, 1994b).

2. Toroidal DNA as an Antennae for Subtle Energy

The hypothesis presented below about the function of toroidal DNA has not been considered by the molecular biology community. It is proposed here that the toroidal shape of DNA functions as an antennae to allow DNA to sense subtle energies in the environment. In addition the hypothesis states that toroidal DNA acts as a transducer converting subtle energy into conventional EM energy which is then radiated from the DNA to produce a variety of intracellular events at the biochemical level. As mentioned above, experimental evidence already exists indicating DNA emits EM fields in the form of coherent photons (Rattemeyer, 1981).

The scientific basis for this Toroid Antennae Model of DNA function is founded in EM field theory and some recent experimental data indicating a subtle energy field template around the physical DNA molecule (Poponin, 1995). Conventional EM field theory is based on the assumption fields are generated from point charges and radiate outward in a spherical manner from their source. In addition the EM field, magnetic vector potentials, A, and electrostatic potentials, φ, also exists. Potentials can be considered more fundamental that fields since EM fields can be mathematically derived from potentials (Olariu and Popescu, 1985). Beltrami first considered the possibility that EM fields might also be derived from potential surfaces which are not spherical in shape (also know as topology) (Beltrami, 1889, 1985). He proposed and mathematically demonstrated that EM fields could be generated from potentials with a negative Gaussian curvature. Beltrami considered the toroid as a key negative Gaussian curvature surface in his theory. His theory further demonstrated mathematically the topology of the EM fields generated from toroidal potentials. Interestingly, the topology of these EM fields was described as helicoid referring to their helical shape (Bjorgum and Godal, 1952). Beltrami's theories have not been in favor with most of the physics community, although Kovac has recently re-examined these theories and used them to explain his anomalous results in the field of plasma physics (Kovac, 1996). Hull extended Beltrami's theory by demonstrating that the toroid is composed of two additional negative Gaussian surfaces, the pseudosphere and the catenoid (Hull, 1996).

The catenoid is of particular interest here since it is the same shape that Wheeler (1962) uses in his theory to describe how wormholes act as transducers for higher dimensional energy to influx into our 4D space/time reality. As similar idea for the influx of energy from higher dimensions has also been proposed (Shacklett, 1993) based on Twistor theory (Peat, 1988) which is based on a unique topology composed of a catenoid inside the hole of a toroid.

These modern theories in quantum physics therefore support the Toroid Antennae Model of DNA by suggesting the toroid acts as a transducer for some new form of energy (ie. subtle energy) which exists in higher dimensional spaces. The nature of this type of energy or information has been considered by other scientists and has received a variety of names including non-Hertzian, scalar, tachyon and zero point energy. The biological role of these forms of subtle energy has also been studied by the author and summarized elsewhere (Rein, 1992).

Additional evidence for the Toroid Antennae Model comes from some recent unpublished research with DNA at the Russian Academy of Science. These experiments used a sophisticated machine (Laser correlation spectroscopy) to measure the scattering of laser light after it passes through the DNA molecule. The scattered light thereby creates a pattern which is distinctly different from the control in the

absence of DNA. However, after removing the DNA from the machine, a third pattern was obtained when the laser was directed at the space where the DNA had been (Popponin, 1995). This experiment elegantly demonstrates for the first time that there is some kind of energy template which is left behind in the machine (after the DNA had been removed) which scattered light in a similar , but different, way as does the physical DNA molecule. Furthermore, these experiments could determine by the nature of the scattered light that the energetic template was coherent. Although these experiments do not indicate the shape of this template, a toroidal shape is likely since toroids are themselves highly coherent.

These results support the hypothesis that coherence is critical in the connection between conscious intention and DNA. The overview of how consciousness can promote healing is summarized below. Specific thoughts and intentions are generated by the brain/mind and are used to frequency modulate the coherent bio-fields from the heart. When one is in a state of love the coherence is enhanced and the bio-fields become stronger. This allows for a resonance between the coherent fields of the heart and the coherent fields around the DNA molecule. This process is further enhanced by the presence of subtle or spiritual energies which resonate with the body due to the toroidal nature of the coherent bio-fields. Such an interaction allows the frequency information associated with the original intention to manifest as a physical change in the DNA, whether it be a conformational change in the structure of the helix, a change in DNA replication or a shift in the electrical properties. In this way our thoughts and intentions can manifest in the body at the biochemical level bringing about actual physiological changes associated with the healing process.

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