



Information-based consciousness and psi: The Cryptochrome Theory

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Abstract

Evidence that consciousness is information-based is the extensive evidence for the existence of psi. To explain this process, I developed the Cryptochrome Theory (CT), which hypothesizes that cryptochrome, a flavoprotein present in all living systems, is a “transducer” of psi because it has the characteristics of quantum biological molecules. According to the CT, consciousness triggers a cascade of biochemical reactions that lead to the manifestation of psi. A series of rigorous psi experiments were conducted on targets ranging from humans to plants to stem cells to support the CT. The paper also concludes by providing possible topics for future research.

Key words: consciousness, Cryptochrome Theory, cryptochrome, mind-matter interaction, quantum, psi, nonlocal, synchrony

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Introduction

published from 2008 to 2016 that support von Neumann’s conjecture: The human mind appears to interact directly with properties of the quantum world. However, if we are to supply adequate measurement process. Radin’s team (2-6) has provided empirical evidence for this conjecture generally, we must assume that consciousness is energy-based as



well as information-based. Evidence that suffering. The second is to understand Buddhist consciousness is information-based is the extensive wisdom, especially those elements that apply to evidence for the existence of psi(7), which survival of human consciousness after bodily death. demonstrates that consciousness transcends the boundaries of space and time. For example, one can use psi to grasp the Buddhist truths of impermanence, suffering, the doctrine of

During the past 30 years, many researchers have independent origination, and contentless obtained enough positive psi results in consciousness(15, 16, 19-21).

methodologically rigorous studies with rigorous In this paper, I attempt to contribute to the case methodology to demonstrate the reality of *psi* that *consciousness* is energy-based by citing (8-14). In Buddhism, when one achieves the evidence that *psi* is energy-based. To provide a Buddha/nonself state, or contentless consciousness, possible explanation of the relationship between one gains psi abilities(15, 16). According to Buddhist energy and psi, I introduce my Cryptochrome teachings, everyone potentially has six kinds of *psi* theory (CT). Focused on the behavior of quantum ability(17, 18). The first is clairvoyance, or ESP of biological molecules, the CT describes how both physical objects or events in the external consciousness and psi might work.

environment. In Buddhism it refers, for example, to the paranormal ability to see where sentient beings die and where they reincarnate. The second is clairaudience, or ESP of sounds emitted by external objects or events. In Buddhism, it refers, for example, to the ability to hear the vocal utterances of sentient beings, especially when they are suffering. The third psi ability is teleportation, the paranormal ability to transport oneself or an external object to some other location. The fourth psi ability is telepathy, the paranormal ability to apprehend sentient beings' feelings, perceptions, thoughts, and other experiences. The fifth psi ability is to know what sentient beings did in all their past lives. The sixth psi ability is to enter the nonself information about deceased individuals under Buddha state. Note that this is the only one that requires that one attempt to understand Buddhist wisdom; the other five can be achieved by applying the wisdom of one's own culture, for example.

Empirical evidence for the energetic properties of consciousness and psi
 The evidence for the energetic properties of consciousness and psi, including mediumship studies, effects of a magnetic field on EEG, effects of a magnetic field on psi performance, and magnetic radiation penetrating an electrically shielded cover and bodily tissues are elucidated below.

Mediumship studies
 The existence of non-local conscious information transfer has been supported by many studies of trance mediums that appear to have acquired information about deceased individuals under experimental conditions that defy conventional explanations(22-25). A meta-analysis of the results of all experiments on non-local information acquisition by mediums published from 2001 to

In Buddhism, there are two reasons why we are given psi abilities. The first is to help others who are above-chance accuracy of apparently anomalously



received information about deceased individuals (11). The geomagnetic magnetic field, created primarily by the flow of liquid iron in the earth's inner core. The

two kinds of information supplied by the

Effects of a magnetic field on EEG

Evidence that consciousness and energy can transcend the boundaries of space and time more complex parameters, such as the field's travelling in synchrony is provided in studies in which a participant's state of consciousness is altered by applying a magnetic field to the brain or presenting a visual stimulus that causes a predictable and detectable EEG pattern in the brain. The idea that magnetic fields can influence of another participant some distance away. In one such study, altering the EEG in one person caused brainwaves of a distant person to reflect the manipulated and predicted mood or emotional state (positive, negative, calm, or neutral) of the distant person (26). When 5 Hz, 8 Hz, 10 Hz, or 15 Hz flashing lights were presented to one of a pair of unrelated people, correlated EEG patterns over the right parietal regions of both participants were found in response to yoked circumcerebral magnetic fields (27). Some have thought that the operative process in these studies is genetically related but others have disagreed (29, 30).

The geomagnetic field are (a) the directional orientation of the field (e.g., north or south) and (b) several more complex parameters, such as the field's inclination angle and its intensity at the earth's surface (31). The geomagnetic field is formed by electrical charges, including the very weak charges emitted by the human body. The idea that magnetic fields can influence performance in psi experiments is not radical. Many studies have shown that human brain function can be affected by magnetic fields (32-34). For example, there is evidence that geomagnetic activity can influence memory retrieval (35), electroencephalographic power (36), heart rate (37) and evoke unusual perceptions such as a sense of presence, fear, and odd smells (38, 39). It has been hypothesized that scores on psi tasks might be higher when the test is given in a period of low geomagnetic activity (40, 41). Effects supporting this hypothesis have been found in several experiments (42-45).

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Effects of a magnetic field on psi performance

Magnetic radiation penetrating an electrically shielded cover and bodily tissues

A possibly important characteristic of consciousness is suggested by its response to magnetic fields. The biological cells of living beings, as well as the micro-level components of non-biological systems that emit electromagnetic radiation. An example of the latter, commonly used in psi experiments, involves random number generators that sample the output of an electronic noise source or the decay of an extremely weak radioactive source. Moreover, all of us are affected by the earth's



information can penetrate an electrically shielded Cryptochromes are blue photoreceptors that cover, it is highly likely that it can easily penetrate detect 400 to 500 nm signals. Found in bacteria, bodily tissues.

plants, animals, and humans, cryptochromes influence an organism's growth and the maintenance of circadian rhythms(57-60). Any

The Cryptochrome Theory and supporting empirical evidence

protein with a DNA sequence, 25-50% of which matches the DNA sequence of photolysis but lacks the capacity of the latter to repair DNA damage of the range of the normal senses (i.e., psi) is caused by ultraviolet radiation by using blue light, is mediated by an energy activated by consciousness, cryptochrome(61, 62).

the intensity of which falls below some Cryptochromes are an attractive candidate for the threshold. The energy could be magnetic waves, psi receptors, in that they are present in all bodily radiation, light, gravity, or a currently unknown form tissues. Their concentration is greatest in the inner of energy. The information might be represented as retina(62, 63) and the pineal gland(64, 65). Thus, it is changes in the rate of flow of this energy from plausible to hypothesize that psi signals penetrate multiple sources in multiple bodily structures, at these particular tissues and interact with the travelling in synchrony. cryptochromes within them. It has been suggested

If this is how psi occurs, any proposed that the process by which information located in mechanisms for the initial stages of the perceptual proteins is converted into the structures and process must account for the findings described functions of biological cells that react to earlier in this paper. In particular, the mechanism environmental stimuli and perturbations is a type of must be able to succeed using EMFs or other types genetic or protein expression or a large quantity of of energy when they are very weak. One of the messenger RNA(66).

more likely possibilities is that psi directly affects Chemical reactions that transition between biological molecules(48), which then produce different spin states can be affected by magnetic chemical reactions. Another possibility is that fields or light. The hypothesized radical-pair cryptochromes have an important role to play in the mechanism requires that even a weak magnetic detection of photons or other forms of weak field can change the dynamics of this transition from magnetic radiation(49, 50). Cryptochromes are ideal one spin state to another(31, 49). In other words, it candidates for the detection of psi signals for functions as a switch when triggered by an external consciousness(48) which is carried out by magnetic field, which in turn increases the speed of hypothesized radical-pair mechanism(51-53). There chemical reactions(59, 60).

is empirical support for the hypothesis that when Research indicates that signals produced by radio magnetic fields are activated, even in a totally dark frequencies within the ELF range can environment, a photoexcitatory function of radical-pair reactions(59, 67). It also has cryptochromes is activated(51, 54-56). been suggested that chemical reactions are broadly



sensitive to weak (< 1 mTesla (T)) static energy ~~cryptochromes~~ cryptochromes are most highly concentrated. ELF fields or, more specifically, that the radical-pair mechanism can be influenced by a 5-50 MHz ELF field or a ~ 300 μ T radio-frequency magnetic field of the thalamus. René Decartes argued that the presence of a 0-4 mT static magnetic field(67) pineal gland in humans is the "principal seat of the (Note that 1 m T ($T = \text{Weber/m}^2$) equals 10^{-3} T, and $1 \mu\text{T}$ equals 10^{-7} T.)" It is often called the "mystery" gland, or third eye, because it is thought to have the capacity to

In short, the induction of chemical reactions cause mystical experiences. I hypothesize that the cryptochromes can be accomplished by changing pineal gland is where the psi signals described in the the correlated spin states of paired radical ions(31) preceding paragraph end their journey and interact 49), but a specific number of paired radicals with cryptochromes residing there. Another chemical reactions must be activated for the energy important hypothesis is that cryptochromes not only to exceed the differential threshold and be detected receive the psi signals but also send them, like an antenna. If the differential threshold is for magnetic fields, at

least 4×10^{10} radical pairs in 4 mm^3 are required to detect a difference of 10^{-6} T, or 2% of Earth's magnetic field(68). It is logical to expect that such specifications can be found for weak information signals carried by other kinds of energy besides magnetic fields. *How the CT helps explain results of certain psi experiments* A quiet state of consciousness facilitates psi performance in the lab is enhanced when the participant is in a quiet state of consciousness(69).

The question then becomes: Can psi signals? One common explanation of why such a state which as noted above, can consist of many different improves ESP performance is that it reduces internal forms of energy, activate the radical pairs isomeric noise, increasing the signal-to-noise cryptochromes so the information the signals carry ratio(70). The CT provides two possible biological can be detected? If so, it appears that these signals explanations for this effect. First, a quiet state of can trigger chemical reactions in the cryptochromes, mind such as that induced by meditation enhances changing the spin states of paired radical ion the effectiveness of the radical-pairs mechanism by Because the influence is weak, the differential reducing thermal noise in the body (68, 71). Second, threshold for detection of the psi signal must be quiet states of mind, such as meditation, have been determined by the sum of chemical reactions over found to be accompanied by a low core body large area. For example, psi may activate temperature (CBT)(72). CBT, usually measured at the cryptochromes in all bodily tissues of the body, and esophagus, rectum, mouth, or external auditory then the summed signals from all these tissues are eardrum membrane, reflects slight, momentary distributed to the entire brain. Psi information is changes in blood temperature and is not affected by most likely to originate in the inner retina and pineal the external environment. Clearly, a lower CBT gland, because, as noted above, these are where reduces thermal noise in the body(71).



participants who drank the treated tea, the positive change in mood was much greater if they believed they were drinking treated tea than if they believed they were drinking untreated tea (Cohen's $d = 1.45$, $p = .00002$, two-tailed). In other words, tea treated with good intention improved participants' mood more than untreated tea from the same source. Participants who believed they were drinking treated tea produced a big improvement in mood, but only if they were actually drinking the treated tea. These two findings together demonstrate the effect of an interaction between belief and treatment on mood.

The first study explored whether drinking tea "treated" with positive intention by the monks would improve one's mood more than drinking untreated tea (73). Each evening for seven consecutive days volunteer participants recorded their moods on the Profile of Mood States (PMS). To follow-up on the results of the previous study, On experimental days 3, 4 and 5, each participant drank 600 cc of oolong tea in the morning and 600 cc in the afternoon. The two groups were randomly assigned to the conditions. The experimental group received tea previously treated with intention by three monks. The intention they were asked to concentrate on for 22 minutes was the following: "An individual who consumes this tea will manifest optimal health and functioning at physical, emotional, and mental levels, and in particular they will enjoy an increased sense of energy, vigor and well-being." The control group received untreated tea from the same source. Those who both drank treated tea and believed that the tea was treated showed a greater improvement in mood on the PMS across the seven sessions than those who drank untreated tea but believed that the tea was treated (Cohen's $d = 0.65$, $p = .02$, two-tailed). Among



The same three Buddhist monks used in the previous study focused their intention on amounts of anthocyanin and chlorophyll all reflect commercially bottled water such that watering then enhanced photomorphogenic growth. The seeds with this treated water would encourage the results from this experiment suggest that plants to grow larger than would plants from seeds watered by untreated bottled water from the same source. The treatment process was the same as in the third study we attempted to replicate the the previous study, except for the intention: “The results of the seeds experiment above, adding a seeds that absorb this water will manifest optimal condition in which the seeds instead of the water growth; in particular, they will have increased were treated with intention (76). *Arabidopsis* seeds nutrition, energy, vigor and well-being.”. again were used, again because they contain

Arabidopsis seeds were used because they contain cryptochromes, making the study conditions as before, highly significant differences particularly relevant to the CT. Specifically, seeds were found between the effects on the growth of with one of three variations of cryptochrome were *Arabidopsis* plants of water treated by the same used: a wild type of *Arabidopsis* (Columbia-4), three monks using the same process and intention gain-of-function mutation (*His-cry2*), and a loss-of-function mutation (*cry1/2*); “gain” and “loss” referred to increased and decreased sensitivity to blue light, assessed in the previous study: shorter hypocotyl respectively. After the seeds had been allowed to grow for three days, combined data from the four sessions showed that compared to untreated seeds, treated seeds produced significant effects on all three measures of growth in *Arabidopsis*: (a) shorter hypocotyl lengths in plants with the *His-cry2* mutation (treated mean 1.31 ± 0.01 mm; untreated mean 1.43 ± 0.01 mm, $p < 10^{-13}$); (b) higher levels of anthocyanin with all three forms of intention improved the growth of *Arabidopsis* cryptochrome, although only plants with the *His-cry2* mutation showed a significant effect (treated mean 17.0 ± 0.31 mg; untreated mean 14.5 ± 0.31 mg, $p < 10^{-4}$); (c) a modestly higher level of chlorophyll in plants with the *His-cry2* mutation (treated mean 247.6 ± 5.63 mg; untreated mean 230.6 ± 5.63 mg, $p = .05$). The directions of all three effects match the monks’ intentions, in that research to see if intentionally treated water would

Under the same highly controlled conditions as before, highly significant differences were found between the effects on the growth of *Arabidopsis* plants of water treated by the same used: a wild type of *Arabidopsis* (Columbia-4), three monks using the same process and intention gain-of-function mutation (*His-cry2*), and a loss-of-function mutation (*cry1/2*); “gain” and “loss” referred to increased and decreased sensitivity to blue light, assessed in the previous study: shorter hypocotyl lengths ($p = 0.04$), higher chlorophyll levels ($p = 0.0005$), and higher anthocyanin levels ($p = 2 \times 10^{-6}$). When the seeds were treated instead of the water, plants in the treatment condition had higher levels of chlorophyll than those in the control condition ($p = 0.04$). In all four conditions, the directions of the effects matched the intention of the monks. We concluded that once again water treated with higher levels of anthocyanin with all three forms of intention improved the growth of *Arabidopsis* cryptochrome, although only plants with the *His-cry2* mutation showed a significant effect (treated mean 17.0 ± 0.31 mg; untreated mean 14.5 ± 0.31 mg, $p < 10^{-4}$); (c) a modestly higher level of chlorophyll in plants with the *His-cry2* mutation (treated mean 247.6 ± 5.63 mg; untreated mean 230.6 ± 5.63 mg, $p = .05$). The directions of all three effects match the monks’ intentions, in that research to see if intentionally treated water would

Effects of intentionally treated water on the growth of human stem cells
In the fourth study, we continued this line of research to see if intentionally treated water would



affect human mesenchymal stem cells (MSCs) death. We concluded that intentionally treated water appeared to have some biological effects on the growth, pluripotency and senescence of human MSCs, especially in one of the two groups of donor cells tested.

absorb this water will manifest optimal growth; in

particular, they will have increased nutrition, energy

vigor and well-being. This intended enhancement is only for this batch of water.”. Otherwise, the treatment process was the same as in the previous seeds studies. Proliferation averaged across the two groups of cells from two different donors showed overall increased growth with treated vs. control water ($p = .0008$). Donor cells #1 and #2 considered separately differed in the same direction, but the differences were not significant. As for the cell cycle,

there was significantly more activity in the #2 cells in the S interphase with treated water than with untreated water ($p = .04$). Only the NANOG gene expression averaged across the two donor cells was significantly in the predicted direction ($p = .01$); by contrast, the corresponding p16 gene expression was significantly opposite to the predicted direction ($p = .005$, one-tailed, post-hoc). NANOG is a protein that maintains pluripotency by suppressing cell determination factors. For the #1 cells, no differences were significant except for p16 effect opposite to that predicted for p16 ($p = .05$). For the #2 cells, three genes were significantly in the predicted direction: NANOG ($p = .0008$), OCT4 ($p = .005$) and P53 ($p = .05$); p16 was significantly opposite to the prediction ($p = .001$). OCT4 is a protein involved in the self-renewal of undifferentiated embryonic stem cells. P53 is a protein involved in controlling cell division and cell



that have sufficient spatial resolution and field to show how the incorporation of biological sensitivity to monitor the radical-pairs mechanism processes through the CT furthers its capacity to One promising possibility is the atomically and coherently explain the psi abilities of magnetometer (80), which is a radio-frequency human consciousness, with an aim to help guide atomic magnetometer. This magnetometer might be future and innovative research to mutually advance applied to directly measure the interaction between both scientific theory, research, and applications in intention, psi and CRYs' radical-pairs ways that benefit the world. Although we have a process. Moreover, a novel transient absorption long way to go to meet these lofty objectives, I hope spectroscopy drawing of the radical pair mechanism the paper will make a positive contribution to the has been designed to demonstrate a pronounced emergence of significant new avenues for the orientation-dependence of the magnetic field development of novel human technologies towards response of a molecular triad system in the field the creation of a healthy, and peaceful world. region relevant to avian magnetoreception(53).

Though the chemical compass response did not **Declarations**
directly measure the radical pairs mechanism, The author declares no conflict of interests.
exhibits the properties of an inclination compass, as
found in migratory birds. The results also provide **References**

further guidelines for the design and operation of 1.
tool to measure if intention or psi might affect the
chemical compass. Exploiting these would lead to a
better understanding of the mechanisms by which 2.
the mind directly affects its physical environment.
Because most application-oriented psi research has
focused on the health and well-being of living
organisms, the first of these new technologies 3.
would likely be in the domains of medicine and
agriculture. By leveraging the results of psi research
that two people not in sensory contact with each
other can nonetheless communicate—by the 4.
consciousnesses acting in synchrony with each other
across unlimited distances of space and time
(according to the CT)—we could also develop
communication technologies that could be used for
multiple purposes including, for example 5.
communication during space travel.

My ultimate purpose in presenting this paper was

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