

THE LIQUID CRYSTALLINE COLLAGEN CONTINUUM THEORY OF ACUPUNCTURE AND THE CLINICAL APPLICATIONS IN VETERINARY ACUPUNCTURE PRACTICE

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INTRODUCTION

There is an increasing interest in veterinary acupuncture, both by the veterinary medical community and the public. With this increased awareness, there has been an increased interest in having a better understanding of the physiologic basis and its clinical applications. The understanding of Traditional Chinese Medical (TCM) and Traditional Asian Medicine (TAM) theory offers veterinarians a wealth of appreciation and knowledge of how acupuncture works based on a long history of evidence based medicine in Asia through nature and naturally occurring phenomenon. Yet, as both western, conventional human and veterinary medicine emphasize the need for a western medical understanding and “scientific” proof of how acupuncture works as well as the anatomy of acupuncture points and pathways, we need to be continuing to pursue research and understanding based on western neurophysiologic and anatomic studies as well.

During the past few decades of research pursuing an understanding of the physiologic and anatomic basis, a number of theories have been proposed to explain all the varied effects of acupuncture. Yet, each proposed theory only explained a limited number of the effects of acupuncture. When reviewing all the different theories in

order to update my lectures on the scientific basis in the late 1990's, I read Dr. Ho's Liquid Crystalline Collagen Continuum Theory (LCCC) of Acupuncture and realized that it connects all the other theories with the classic TCM theories into a cohesive, practical explanation of the scientific basis of acupuncture. As we entered into the 21st century, there has been increased research documenting the LCCC Theory and fascia based acupuncture theory.

The LCCC theory offers a greater appreciation of the value of the traditional Chinese medical theories (TCM) of Five Element Theory and Eight Principle Theory. Scientific research has been able to document many of these effects and the LCCC weaves together the TCM principles with western medical theories. The western medical theories including the gate and multiple gate theories, vascular and neuroanatomical, autonomic theories, humeral mechanisms as well as the bioelectric theories can also be all interconnected and understood more clearly based on the LCCC Theory. The bioelectric theory of acupuncture can be explained now based on the LCCC Theory. Dr. Ho's original papers are included in this IVAS proceeding as well. Dr. Kim Henneman presented a further, more expansive interpretation of the LCCC Theory based on the latest in biophysics, quantum physics and other fields in the 2015 IVAS annual conference (2). Dr. Henneman's papers are also included in this proceeding, with her permission, in order to facilitate an appreciation of the continued evolution of these theories without any redundancy.

The integration of all these theories and their clinical applications in veterinary practice will be discussed.

SCIENTIFIC BASIS

A new theory has been proposed on the scientific basis of acupuncture, The Liquid Crystalline Collagen Continuum Theory by Dr. Mae-Won Ho (1). Dr. Ho proposes that the

acupuncture system and the direct current bioelectrical body field are both located in part in the continuum of the liquid crystalline collagen fibers that constitute the majority of connective tissue (1). This offers further validation to the bioelectric theory of acupuncture, that “Chi” or one component of it is based on a bioelectrical body field located within the liquid crystalline collagen continuum of connective tissue. Bound water layers on the collagen fibers provide proton conduction pathways for rapid intercommunication throughout the body, enabling the organism to function as an integrative circuit (1). Water and collagen are two of the best conductors of electrical currents. A review of the biochemistry, cell biology, biophysics and neurophysiology supporting this hypothesis are reviewed in Dr. Ho’s paper (1,2). Dr. Ho is now deceased, but IVAS has her previous permission to reprint the paper in the 2005 IVAS proceeding and hence are reprinted here as well. Dr. Ho’s papers and Dr. Henneman’s papers provide the foundational background from where these papers continue.

A brief review of the western medical theories of acupuncture can help us appreciate how the LCCC ties them all together. Science based acupuncture (AP) may be defined as the stimulation of specific predetermined points on the body to achieve a therapeutic or homeostatic effect. Acupuncture points are areas on the skin of decreased electrical resistance or increased electrical conductivity. Acupuncture points correspond to four known neural structures. Type I acupoints which makeup 67% of all acupoints, are considered motor points. The motor point is the point in a muscle which when electrical stimulation is applied, will produce a maximal contraction with minimal intensity of stimulation. Motor points are located near the point where the nerve enters the muscle. Type II points are located on the superficial nerves in the sagittal plane on the midline dorsally and ventrally. Type III acupoints are

located at high-density foci of superficial nerves and nerve plexus. For instance acupoint GB-34 is located at the point where the common peroneal nerve divides into the deep and superficial branches. Type IV acupoints are located at the muscle tendon junctions where the Golgi tendon organ is located (3). Histologic studies have revealed that small microtubules consisting of free nerve endings, arterioles, lymphatics and venules penetrate through the fascia at acupuncture points. Based on this histologic evidence they have also been called neurovascular nodes (3). These neurovascular microtubules are all bound together with fascia, the continuum of the liquid crystalline collagen fibers, creating a connection from the epidermis through the dermis, subcutaneous fascia, and musculature and to the central nervous and cardiovascular system.

Acupuncture has many varied physiologic effects on all systems throughout the body. No one mechanism can explain all the physiologic effects observed. The traditional Chinese medical theories have explained these effects for four thousands years based upon empirical observations and descriptions of naturally occurring phenomena. The acupuncture meridians that have been described in TCM and yet elude much of western research can be explained now through the LCCC. The “Qi” or “Chi”, a bioelectrical current, is transmitted via the liquid crystalline collagen continuum.

Scientific research has been able to document many of the effects of acupuncture. The western medical theories include the gate and multiple gate theories, autonomic theories, humeral mechanisms as well as the bioelectric theories. The neural non-opiate or gate theory attempts to explain the analgesic effects of acupuncture. It involves the interaction of inhibitory interneurons on pain transmitting neurons. The gate theory can also be explained within the LCCC theory via the fascial covering of nerves including

the myelin sheath and glial cells.

The neural opiate theory is based on evidence that acupuncture stimulates the release of endogenous opiates, endorphins and enkephalins. This mechanism acts at several levels in the central nervous system to inhibit pain perception in higher centers and to inhibit pain transmission from the spinal cord via descending inhibition. The hormonal opiate theory involves the interaction of neurons with the subsequent release of humoral factors from the hypothalamic-pituitary axis. Acupuncture facilitates the function of the neuroendocrine system and has been found to have effects on ovarian, testicular, thyroid, parathyroid and pancreatic function (4). Through its effects on the neuroendocrine system and its homeostatic regulatory functions it has been found to effect blood pressure, pulse, respiration, gastrointestinal motility, hormone secretion, leukocyte production and accelerate the healing process (4).

Many of our somatovisceral reflexes may be explained through the autonomic theories of acupuncture. Cutaneous needle stimulation is transmitted to the internal viscera through the somatovisceral neuronal synapses in Laminae I & V of the spinal cord. Essentially, acupuncture stimulates various sensory receptors (pain, thermal, pressure, touch), which thereby stimulates sensory afferent nerves that transmit the signal through the central nervous system to the hypothalamic-pituitary system. Various neurotransmitters and neurohormones are then released and have their subsequent effects throughout the body. A detailed description of the physiologic basis of acupuncture is reviewed by Steiss (4). The LCCC of the fascia is the connecting link from the somatic tissues to the visceral tissues, offering further edification of the somatovisceral effects of acupuncture.

The search for an anatomical and functional basis for acupuncture points and meridians has led to proposals that

they are based on the vascular system, the nervous system, the lymphatic system or some mysterious unknown combination of them, yet still remained elusive. Becker in 1990 proposed that the DC bioelectrical current was being transmitted through perineural cells, yet that too would not explain all the effects. It appears that the DC field is functionally interconnected with the nervous system and yet exists outside of the nervous system (1). It would also not explain that the speed of nerve conduction is slower than that of acupuncture and that nerves do not reach all parts of the body that acupuncture effects are transmitted through. This is why Dr. Ho proposes that the DC electrodynamic field and acupuncture pathways share a common anatomical based that is “the aligned, collagen liquid crystalline continuum in the connective tissues of the body with its layers of structured water molecules which supports a rapid semiconduction of protons” (1). Dr. Ho believes that this readily enables intercommunication throughout all parts of the body allowing the body to function as one coherent whole (1). Dr. Ho and her collaborative researchers “propose that this LCCC actually constitutes a body consciousness that is functionally interconnected with the brain consciousness of the nervous system” (1) Dr. Ho states that “connective tissues may also be largely responsible for the rapid intercommunication that enables our body to function effectively as a *coherent* whole, and are therefore central to our health and well-being”. Her theory is a foundation for interconnectedness within the body and brain consciousness as well as beyond one body and the interaction between bodies as is described in Field Theory that will be discussed later in these lectures.

Liquid crystals are defined as states or phases of matter in between solid crystals and liquids, also called mesophases (1). Liquid crystals are flexible and responsive. They can vary in structure from being more liquid to being more

crystalline like (1). They are influenced by temperature, hydration, pH and this explains why these variables can impact on the effects of acupuncture. Dr. Grey refers to liquid crystals as “tunable responsive systems” which makes them an excellent foundation for living organisms (1). Essentially, all organisms are a continuous liquid crystalline matrix. NMR studies have documented this (1).

It is fairly well accepted now that all the major constituents of living organisms may be liquid crystalline. This includes lipids of cellular membranes, DNA, possibly all proteins, especially cytoskeletal proteins, muscle proteins, and proteins in the connective tissues such as collagens and proteoglycans (1). Nuclear magnetic resonance (NMR) studies of muscles in living human subjects provide further evidence of their "liquid-crystalline-like" structure (1).

Essentially it appears that organisms may be fundamentally liquid crystalline.

The LCCC Components: Fascia: Collagen and Structured Water

Historically, connective tissue has been viewed more as a mechanical structure maintaining body continuity and shape rather than an elaborately organized “global tensegrity system” allowing for an interconnected malleable comprehensive continuum of bioelectrical communication (1). Connective tissue is the glue, so to speak of this liquid crystalline matrix.

Collagen

Collagen makes up at least 70% connective tissue along with water, the other major component. Collagen actually is the major component of all multicellular animals. These are the best natural conductors of bioelectricity. NMR studies have revealed that there are three populations of water molecules associated with collagen: interstitial water, bound water and free water (1). Bound water is structured

into what is called a “microtrabecular lattice” that gives cells their “solid state” appearance (1). This ordered network of water interspersed within the protein fibrillar matrix of collagen provides the support for the rapid jump conduction of protons (1). This integrative network of water and collagen links the extracellular to the intracellular liquid crystalline matrix providing the electrical rapid intercellular communication throughout the body (1).

Kumka states “all the fascia in the body is connected to itself, from the loose superficial to dense investing layer of muscles to the fascicular tubes of tendon, ligament and neurovascular bundles; it is essentially “an uninterrupted viscoelastic tissue which forms matrix” that is “virtually inseparable from all structures of the body and acts to create continuity amongst tissues...” (5). Within this collagen matrix are the transiting neurovascular bundles that serve the body, from brain (the dura and pia maters are also connective tissue fascia) to spine to neuromuscular junction (6).

The structure and orientation of collagen with its bound water within the liquid crystalline mesophases allows for the efficient intercommunication throughout the body. This collagen fiber alignment provides the bioelectrical intercommunication system that we see in acupoints and meridians. This may be why scar tissue appears to disrupt the flow of “Qi” along acupuncture meridians. This is similar in tendons and may explain why structural damage to tendons and ligaments may benefit from electroacupuncture stimulation.

The structure and orientation of collagen liquid crystalline mesophases in all connective tissue allows for the speed of communication and efficiency of intercommunication throughout the body. These conduction pathways appear to correspond to acupuncture meridians.

The Fourth Phase of Water: Liquid Crystalline Water

Until recently water has been considered to have three phases: solid, liquid, and vapor. Dr. Gerald Pollack, a professor of biomedical engineering at the University of Washington has uncovered a fourth phase. This phase occurs next to water-loving (hydrophilic) surfaces. It is surprisingly extensive, projecting out from surfaces by up to millions of molecular layers. It exists almost everywhere throughout nature, including in your body. In fact, it is this phase of water that fills your cells.

It is beyond the scope of this paper to appreciate all the implications of Dr. Pollack's research on the fourth phase of water. He describes this newly identified phase of water in his book, "The Fourth Phase of Water: Beyond Solid, Liquid and Vapor" (7) published in 2013. The book documents the basic findings and presents a multitude of varied applications. This fourth phase of water is an ordered or structured phase. Pollack states: "fresh experimental evidence not only confirms the existence of such an ordered, liquid-crystalline phase, but also details its properties. It is more viscous, dense and alkaline than H₂O and has relatively more oxygen since its formula is H₃O₂. As a result, it has a negative charge, and like a battery, can hold energy as well as deliver that energy when needed."

It is quite evident how essential water is for our health.

The fourth phase of water offers us further understanding of how it is a conductor of electricity, a holder of memory, a cushion throughout the body, from joints to cells and an integral part of the interconnectedness of the LCCC.

Pollack's lectures and you tube videos offer further insights beyond his books. (7,8,9,10,11,12,13)

Pollack pontificates that: "To think that 99 percent of our molecules merely bathe the "more important" molecules of

life ignores centuries of evidence to the contrary. Water plays a central role in all features of life. Until recently, the understanding of water's properties has been constrained by the common misconception that water has but three phases. We now know it has four. Taking into account this fourth phase, the liquid crystalline phase, allows many of water's "anomalies" to vanish and instead turn into predictable features. Water becomes more understandable to us, and so do entities made largely of water, such as oceans, clouds and human beings" (7).

For a more comprehensive review of the research and implications of Dr. Pollack's discovery of the liquid crystalline phase of water and to appreciate all the implications of this fourth phase, a liquid crystalline structure, I suggest reading Dr. Pollack's book and watching his educational videos (7,8,9,10,11,12,13).

The bound water and collagen combination allows for proton jump-conduction, which is a form of semi-conduction in condensed matter, and is much faster than conduction of electrical signals by the nerves (1). Therefore the actual foundational 'ground substance' of the entire body provides a much better intercommunication system than the nervous system. This explains why acupuncture pathway transmission is faster than nervous system transmission.

The collagens and bound water form a global network. The network appears to retain tissue memory of previous experiences, as well as have the capacity to register new experiences. All connective tissues, including bones, are not only constantly intercommunicating and responsive, but also undergo metabolic turnover like the rest of our body. Dr. Ho then states that "memory is thus dynamically distributed in the structured network and the associated, self-reinforcing circuits of proton currents make up the DC

body field itself”(1). Ho then states, “a body consciousness possessing all the hallmarks of consciousness - sentience, intercommunication and memory - is distributed throughout the entire body” (1). It appears that brain consciousness associated with the nervous system is embedded in body consciousness and is coupled to it (1). This is a profound awareness regarding the foundation that the LCCC forms for a body and brain conscious network. This also seems to explain how acupuncture is a vastly interconnected network of physiologic processes that help with normoregulation and homeodynamics of the body and mind. This is a beneficial understanding of the interconnectedness and how both TCM/ TAM theory and the latest in the scientific basis of acupuncture are all tied together.

Henneman offers an exemplary explanation of the relationship of structured water cluster, quantum theory (QT), crystallized water gels and their relationship to the LCCC and acupuncture (6). I highly recommend reviewing her papers in the 2015 IVAS proceeding. This paper continues and complements where her papers leave off.

We know realize that Quantum Theory (QT) is pertinent to biological systems and explains what was previously unexplainable. With a body being made of over 50% water, what happens at the atomic and subatomic level impacts on the water in the LCCC. That water also has memory has vast implications in how and where our bodies retain memory of past trauma's and injuries and how that interacts with the present moment and the effects of various therapies such as acupuncture.

Fascia

The LCCC Theory and Newly discovered Vascular and Organ Systems

Now that we have an appreciation of the components of the

LCCC and where it is, further research has found even more places where the fascia, the liquid crystalline collagen continuum is located. It is amazing to comprehend that new anatomic structures in the body are still being discovered in the 21st century. It is also quite insightful to recognize the functional implications of the physiologic effects of these new discoveries regarding both the effects in acupuncture as well as conventional medicine.

Yet, apparently there is a new vascular system, “The Primo Vascular System” that has been discovered and documented and offers further evidence of the fascial basis of acupuncture. In addition there has been an entirely new organ classified. That is the abdominal mesentery that is also essentially a fascial connection system.

Fascia and Primo Vascular System

Recently there has been continued research documenting Dr. Bong-Han Kim’s discovery of a third vascular system, the “primo vascular system” (PVS). The PVS is considered as a newly found circulatory system, which is independent of the blood or lymphatic systems. PVS exists in most mammalian organs, forming an extensive network throughout the entire body. It is considered as the anatomical basis of classical acupuncture meridians. Soh claims that primo nodes and primo vessels were related to acupuncture points and the primo vascular system might be an extension of meridians (14).

The PVS is a novel circulatory system forming a network throughout an animal’s body. Originally, Kim identified the novel anatomical vessels as meridian primo vessels and proposed that their distribution mirrored acupuncture meridians. According to Dr. Soh’s observation, the histological structures of PVS and PN are abundant collagen fibers and elastic fibers (14).

Soh also “suggested functions of the PVS, in general,

include a path for neurotransmitter hormones, a circulatory path for primo fluid-containing stem cell like microcells, and proteins related to stem cell differentiation. Evidence also exists for cancer metastasis through the primo vessel. Moreover, PNs and PVS were related to acupuncture points and primo vascular system might be an extension of meridians. He proposes that the functional connection of the exterior-interior PVS between the stimulus of acupoints and responses of organs could explain that PVS is a basis for meridians” (14). Professor Lin Yuan concludes as well “there are close relations of the meridians and acupoints to connective tissues. Fascia forms a whole-body continuous matrix that inter- penetrates and surrounds all organs, muscles, bones, and nerve fibers. It could be considered as a single organ, a unified whole, connection to every aspect of human physiology (14).

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As stated earlier fascia is an uninterrupted viscoelastic tissue that forms a functional collagen matrix that surrounds and connects every muscle and organ, forming continuity throughout the body (14).

Yang et al in their review article on Fascia and Primo Vascular System state that “fascia is considered to be any dense irregular connective tissue sheet in the human body, including aponeuroses, joint capsules, or muscular

envelopes such as the endo-, peri-, and epimysium. The epimysium surrounds each muscle and is continuous with tendons that attach muscles to bones. The perimysium divides the muscle into fascicles or muscle fiber bundles. The endomysium is a continuous network of connective tissue that covers individual muscle fibers. Small fascial fibers extend to connect to the cell membrane itself” (14).

Yang also states “Fascia is also capable of transmitting electrical signals throughout the body (14). Collagen, which is one of the main components of fascia, has been shown to have semiconductive, piezoelectric, and photoconductive properties in vitro. This explains how electronic currents can flow over greater distances. These electronic currents within fascia can be altered by external influences and cause a physiologic response in neighboring structures (14). In TCM and TAM, there are descriptions of how external influences impact on acupuncture effect and this may be one of the mechanisms that explain that.

Fascia and Meridians

The theory of meridians and collaterals is a fundamental pillar of TCM. The search for an anatomical and functional basis has been ongoing. Numerous researchers continue to suggest that the fascia is the basis for acupuncture. A dear friend and colleague, Steven Finando has reevaluated acupuncture proposing that the fascia is the mechanism of action of acupuncture therapy as well. The fascia has also been conceived as a complex communication network that influences and is influenced by every muscle, organ, blood vessel and nerve (15).

Yang et al also state: “the fascia, is our richest sensory organ permeated with four types of sensory receptors. The vascular, nervous, and lymphatic systems all end in the ground substance, providing nutrients to the ground substance as well as information from the periphery. It is

both interesting and highly significant to note that acupuncture is based upon the conception of a metasystem that links and influences every aspect of human physiology. The fascia system provides the anatomical basis of that metasystem” (14).

Mesentery as a New Organ and Potential Fascia Based Acupuncture Pathways

More recently, in November 2016, in the Lancet Gastroenterology Journal, researchers stated, “they have discovered distinctive anatomical and functional features that justify designation of the mesentery as an organ” (16). Contiguity of lymphatic, neurological, vascular and connective tissue is part of the justification of considering the mesentery as one distinctive organ (16). Interestingly, in this article they focus on the pathologic implications of the fascial interconnectivity rather than the potential implications in regards to a vast interconnected communication system possibly relating to acupuncture pathways. Coffey & O’Leary suggest, “Connective tissue contiguity could explain the development of musculoskeletal, ocular, and cutaneous abnormalities in intestinal diseases, such as ulcerative colitis and Crohn’s disease, and might also account for so far unexplained patterns of pathogen and disease spread” (16). Personally I find it fascinating that they propose this as an explanation for many varied diseases throughout the body, without looking at the fascia as the possible bio-information communication pathway connecting all of it diagnostically, therapeutically as well as pathologically.

From an acupuncture perspective, this would explain all the varied effects of acupuncture throughout the body as well as expanding the awareness of the interconnectedness of fascia as this global information system. They state “In summary, advances in understanding of the mesentery now enable a rigorous and scientific study of it.

Accordingly, benefits to gastroenterology are anticipated by improved diagnostics and an expansion of therapeutics in general” (16). My own perspective would suggest that further scientific study of the intercommunication pathways through the connective tissue of the mesentery might offer further documentation of acupuncture pathways and their use diagnostically and therapeutically.

Practical applications of the LCCC Theory in Veterinary Acupuncture Practice

LCCC and Energy

“The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence. To understand the true nature of the universe, one must think it terms of energy, frequency and vibration.”—Nikola Tesla

Now that we have an understanding that the LCCC is a bioenergetic communication system interconnecting the

entire body, we can appreciate how some of the ancient concepts of “Qi” or “Chi” and meridian relate to bioelectrical energy. Scientists now recognize that everything in the Universe is made out of energy. Quantum physicists discovered that physical atoms are made up of vortices of energy that are constantly spinning and vibrating, each one radiating its own unique energy signature. This is also known as “the Vacuum” or “The Zero-Point Field.” (6) This relates to the smallest quanta to galaxies and beyond. The energetic field is not only within each living being as the LCCC, but also connects between beings and between all that is. There is a bioelectrical electromagnetic field that connects all that is. Let us now look at how the LCCC relates to creating energetic fields between living beings, between veterinarians and their patients, clients, staff, colleagues and family.

The LCCC Theory and HeartMath

It is interesting to observe the emerging interdisciplinary approaches that are providing new research and documenting evidence of this quantum field information with interactions between living beings. Research and insights from Dr. Childre’s Institute of HeartMath, transpersonal psychology, Dr. Dan Siegel’s Mindsight, interpersonal biology, quantum physics, new biology, and neurospirituality, to name only a few, all acknowledge the impact of one person’s thoughts and emotions on another. I have come to appreciate that these interactions may indeed relate to human-animal interactions as well. (17)

The HeartMath Institute has conducted research showing heart-brain interactions between persons in close proximity to each other. In “The Compassionate Equestrian” (17), I proposed that the fields documented by HeartMath that emanate from human hearts and interact with each other, also, logically speaking, would also emanate from animal

hearts and impact on each other. I feel this is especially relevant with our companion animals. Recently they have extended that research to interactions between humans and horses and dogs, confirming my beliefs. The HeartMath Institute (18) published their first study on human animal interactions based on the electromagnetic fields emanating from human and horse's hearts (19). What they found is that "there is a relationship between horses and humans that can be measured using heart rate variability (HRV) to potentially determine levels of stress or well-being in the human and the horse when interacting" (19). They also found that "horse's HRV is observed to be similar in frequency dynamics to humans and can be used as an indicator for research studies between horses and humans of well-being and stress reactions (19). They discuss how this may impact on Equine Facilitated Therapy programs and voice some concern regarding safety and potential stress on the horse. Horses reactions appear to depend on the HRV of the individuals working with the horses (19). Their findings offer valuable insights into the way veterinarians and their staff may interact with horses. In addition, they have just published on the interaction of human and dog hearts (20). I would suggest watching their webinars on human animal interactions and it may give you further insights into how the LCCC of each being interacts with others and how you can integrate this awareness into your VAP practice (21). If all our staff receives training in HeartMath techniques, perhaps we can create a more harmonious practice life. If our clients are introduced to these concepts, perhaps we can have healthier, happier relationships with our clients and their animals. Perhaps we can create more harmonious, coherent bioenergetics fields within our veterinary practices. If clients integrate these insights into their relationship with their animal companions, perhaps we can decrease stress related disease in our animal companions and us. These implications will be discussed in the next lectures.

The institute also has found that a type of heart-rhythm entrainment, or synchronization, can occur in interactions between people and their pets (20). Animal lovers can appreciate the results of an experiment HMI Director of Research Dr. Rollin McCraty conducted with his 15-year-old son. With heart monitors on both his son and his dog, McCraty found that when his son entered a room where his dog was waiting and “consciously felt feelings of love and care towards his pet, his heart rhythms became more coherent, and this change appears to have influenced the dog’s heart rhythms, which then also became more coherent.” (20). Especially interesting to veterinarians and clients who are concerned about separation anxiety issues, is what they found when his son left the room. The dog’s heart rhythm became much more chaotic and incoherent. The implications for HMI’s findings on human animal HRV interactions have significant implications for veterinarians in creating harmonious practice environments as well as assisting clients in creating more harmonious home environments and thereby decreasing stress related diseases. It has tremendous implications on how our own personal stress levels impact on our animals. This may be the underlying research finding that can explain what many veterinarians have observed and are often reluctant to discuss.

Namely, that our thoughts and feelings impact on the health of our animal companions. Perhaps, we may be part of the cause of our animal’s health issues. On the positive side, once we become aware of this, we can also become part of our animal companions recovery and prevention of future stress related diseases. I often discuss this with clients when dealing with their worry, anxiety, fear and sadness when dealing with a terminal disease in their animal companion. Clients sometimes ask me if their angst and sadness impacts on their animal’s health as they are dying. As compassionately as possible, I will share that I suggest

that they offer their pet unconditional love and joy whenever they are with them and that if possible, they express their angst and sadness when they are away from them. It might be more beneficial for their animal's health. Clinically and anecdotally, I found that to be true in many cases. On subsequent office visits, clients will express their gratitude for that awareness and have said that their pets do indeed seem happier when they are not crying and so upset around them and that they are then able to express their angst and sadness elsewhere.

The research from HMI is documenting that there is a form of communication occurring between people and between people and animals that is beyond body language or verbal communication. Further research may continue to demonstrate that we are affecting each other's moods and attitudes, both positively and negatively by the electromagnetic fields we radiate. Dr. McCraty states, "In our work with pets and their owners, we're seeing that a pet owner can create what we call a heart-filled environment when practicing heart-focused techniques (a cornerstone of HeartMath tools and technology). The pets respond by becoming more affectionate, more animated and more connected with the pet owner." (HMI) There are vast implications for these findings on veterinary health care. A discussion of the implications can fill a weekend workshop. They will be explored further in the second paper.

The LCCC Theory, The Transpecies Field Theory (TSFT) and Compassionate Field Theory (CFT)

One significant insight that I have had along my veterinary journey is that there seems to exist an interactive energetic field between animals and people. I have experienced this in animal hospitals, horse barns and wherever humans and animals interact. As the new physics, the new biology and other interdisciplinary fields have evolved, documenting

various energetic fields, I was able to understand what I was feeling more. Through years of study and integrating that with my transpersonal experiences, I developed what I call “The Transpecies Field Theory”. The Transpecies Field Theory (TSFT) proposes that there is a dynamic, behavioral, energetic field that affects all of us who interact together. This continuously interactive, energetic, behavioral field impacts all living beings. When every being in the field is behaving based on various “past programming” (their habitual behavior patterns), they will have certain effects on everyone involved. My TSFT theory is based on the combination of various other interdisciplinary theories in the fields of physics, new biology, psychology, and sociology, to name a few. It is a transdisciplinary exploration of the interconnectedness of all that is. (17)

***We are what we think, all that we are arises with our thoughts, with our thoughts we make the world.” –
Gautama Buddha***

Once we recognize that the Transpecies Field exists, the next exciting step is realizing we can actually have a conscious impact on it by focusing our intention and feelings on a particular positive thought or emotion, such as compassion. This is the basis for my other proposed theory, the Compassionate Field Theory (CFT), as well as for my entire approach to human and equine interactions. I describe this in my book “The Compassionate Equestrian” (Trafalgar, 2015). I am currently completing a small animal/ companion animal edition of the book. This awareness led to a multitude of epiphanies. I realized that you could actually enhance the energetic field in a horse barn or animal hospital or anywhere where we interact with animals. I define the Compassionate Field Theory (CFT) as a dynamic, interactive, energetic field that exists between humans and animals that is based on “Quiet

Focused Intention” (QFI) of compassion for all beings, thus positively impacting the behavior of all involved in the field, creating a collective intentionality of compassion.

The potential of the CFT on enhancing the entire atmosphere and ambience of animal hospitals, animal shelters, horse barns and elsewhere is unlimited and can actually have a tremendous benefit on the whole world. I discuss these potentials in more detail in “The Compassionate Equestrian” (17).

Conclusions

We began this journey becoming aware that acupoints, acupuncture meridians and pathways are based on a bioelectrical field that connects the entire body through the liquid crystalline collagen continuum (LCCC). This may imply then that living beings are actually living carbon based liquid crystalline display (LCD) screens. It is also of interest that silicon based LCD material does not seem to be rejected by carbon based living beings when used as tissue replacements such as ligaments. We may then ask with a tinge of introspective humor, “what do we wish to display on our LCD screen?”

Research in interdisciplinary fields of the new physics, biomedical research, new biology, HeartMath and Quantum theory then begin to document that our LCCC may electromagnetically impact on other living beings and their LCCC. This can then extend to an awareness that we are all living in an interactive, biodynamic field that impacts all of us and that we can have an impact on. That begs the question, what impact do we wish to have on others and how can we develop ourselves to have a more positive impact on others. If we are all so intimately connected, then is there anyone other than ourselves? Is there other? Are we truly all one as ancient teachings share? This has vast potential implications on our veterinary practice and personal lives. It may be one way that we can address the

challenges we face in veterinary medicine that the AVMA acknowledges and is beginning to address. It all comes from within ourselves and expands out from there to all others.

This paper presents the evolution of veterinary acupuncture theory from TCM & TAM through what was known in the late 20th century regarding the scientific basis of acupuncture based on the gate theory, neurovascular, and neurohormonal theories as well as the bioelectric theories. As research continues in the 21st century, the LCCC Theory has been able to incorporate all the previous theories into a more cohesive and comprehensive explanation of the scientific basis of acupuncture. The implications and clinical applications of the LCCC Theory in veterinary medicine have been explored based on the integration of QT, the new physics, new biology, HeartMath Research Institute studies and other interdisciplinary fields.

This may be the beginning of a new journey of exploration for all veterinary acupuncturists. Hopefully this offers you a foundation in new fields of scientific research and how they interface with veterinary medicine. These insights can help us be better veterinarians by understanding the scientific basis of acupuncture pathways as a liquid crystalline collagen continuum and how these LCCC's can impact on each other. This allows us to go back to our veterinary practices and integrate these insights and thereby create happier and healthier practices and lives. I invite you to continue this exploratory journey and integrate it into your personal veterinary journey.

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