Acupuncture: The Way to Healing

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ABSTRACT

Both Eastern and Western thinkers now view the human organism as a system, an interconnected whole. We have discovered many connections, including those among and between the nervous system, the endocrine system, the respiratory system, and the cardiovascular system by means of the ever increasing number of newly found peptide messengers, cytokins, and neurotransmitters. Indeed, because of the involvement of the immune system with all the cells of the entire body, it can be said that every cell participates in and is a part of the immune system.

Acupuncture stimulus evokes a chain of events and stirs disturbances at and surrounding both somatic and autonomic nerves. The body's interconnected systems come into play in the following fashion. The stimulation conveys messages to the center of the autonomic nervous system, which decodes the messages received and proceeds with feedback to related organs and targets.

Every cell fluctuates with each other in dynamic waves of negative and positive feedback. Because the body's feedback cycles are so attuned to respond, because everything is interconnected, tiny needles can evoke a profound healing response.

Keywords

Qi, Energy, Hydrogen, Feedback, Neurotransmitter, Immune System, Autonomic Nervous System, ATP, ADP, Five Element Theory

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I am a physician trained in western medicine, trained in the Western way. I am also a diligent student of Eastern medicine and a practitioner of acupuncture in the Chinese way. This means I know about both systems of thought and can explain acupuncture in both Chinese and Western terms.

When one learns about Chinese medicine, especially acupuncture, one encounters terms like:

- Chi (Qi)
- Yin and Yang
- The Five-Element Theory
- Acupuncture Points
- Meridians

When one speaks about acupuncture, one has to speak in the Chinese way. They have used these terms for 3000 years just as ordinarily as we talk about taking aspirin here in the United States. If one doesn't use the Chinese terms, one isn't talking about acupuncture.

Unfortunately, this is exactly what alienates the typical Western doctor or scientist about acupuncture. The words sound too out of date. But, for a Chinese person, the terms are almost sacred.

In Chinese terms, "acupuncture is a healing act of inserting a needle into an acupuncture point in the meridian to correct an imbalance of Qi." Chinese people understand that Qi circulates in the body through the meridians, and that it is important to maintain a healthy balance of Qi in the body.

The important task is finding a way to explain acupuncture in Western medical terms. To do that one must use words found in Western medical textbooks. These words include:

- Hormones
- Immune System
- Molecules
- Neurotransmitters
- DNA
- Genes

These are biomolecular terminologies, terms that in many ways are kept sacred and guarded by Western scientists. They jealously guard this language because it is the hallmark of their reductionist achievement. They say that everything can be explained by exploring the molecules of biology, by examining the DNA of genes, and by analyzing, experimenting and manipulating genes. They have developed vaccines and antibiotics and invented gene therapy. These are all triumphant achievements of the West, and we all benefit from them.

If I can bridge the gap between Eastern and Western terminology, and explain acupuncture in both Western terms and in the Eastern terms of Chinese philosophy, we will gain more than any of us has anticipated.

I am using words like acupuncture, Chinese medicine and Chinese philosophy interchangeably. This is because Chinese medicine, especially acupuncture, developed on the basis of Chinese philosophy. This is the philosophy of Yin and Yang, the philosophy of dynamic change, philosophy of interconnectivity and co-evolution.

It is representatively called the Tao. What is not usually known is that Taoism encompasses the systems theory, complexity theory and chaos theory advocated by today's Western scientists working on the frontiers of mathematics, biology and physics. In short, the Chinese in ancient times, and molecular biologists and physicists in modern times, are talking about the same thing in different ways.

What is Qi?

Some scholars explain Qi as something between energy and matter. Some say it is an energy field, an ephemeral thing, producing work.

It is said that Qi is all over, outside the body, inside the body, in the surrounding environment, in the cosmos, between cells and in cells.

Qi is brought into the body through the air we breathe, the water we drink and the food we eat. It also comes from the mother's essence in the womb. It can be a hereditary thing. Qi is flowing through the body between organs, through the meridians and blood vessels, and Qi is balanced 24 hours a day in a dynamic and fluctuating fashion.

Also, Qi is brought in through acupuncture points located under the skin, bridging the environment's magnetic field and meridians in the body, and then to the organs through the meridians.

According to tradition,[1] there are three sources of "upright Qi" or "normal" Qi before being differentiated into specific functions. First is prenatal Qi, transmitted by parents at conception and responsible for all inherited traits and constitution. The second is grain Qi whose source is food. The third is air Qi which comes from the air we breathe.

Normal Qi has vital and important functions. When food is ingested, it is transformed into essential or non-essential substances, like blood, body muscle, tears or urine.

Qi transforms into useful substances, as well as to non-useful ones. Qi is required to dissipate non-useful ones out to the environment and maintain harmony of form and function. Qi is the source of all movement, such as walking, running, breathing, heartbeat, eating and thinking. In other words, Qi is the source of all voluntary and

involuntary movement. Without Qi, the life functions of somatic and autonomic nervous systems cannot continue.

Also, Qi is not only the source of growth and movement, but also grows with the growth of the body or the bodily function. In Western terms one can say that Qi itself becomes more energetic with higher organization (decrease of entropy).

In the body, Qi is in constant motion, ascending, descending, entering, leaving. According to the Nei Ching,[2] without entering and leaving there is no development. Without ascending, descending, there is no transformation, absorption, and storing. If there is insufficient Qi, if Qi is obstructed or moves in rebellion or moves recklessly, or if any of the Qi regulations lose their regulation, disharmony will result.

Lastly, Qi protects the body. It resists the entry of pathological environmental agents called "external pernicious influences" into the body and fights them if they do manage to enter the body. All of this requires harmonious functioning of Qi.

In summary, Chinese Qi is ubiquitous in cosmos, in the body, and in other matter. It cannot be distinguished as to be either matter or non-matter. Qi penetrates everywhere – all six Yin organs, all six Yang organs. If organized in harmony, Qi brings health. Disease comes if Qi is disorganized or disarranged, or if there is too much or too little Qi.

What I have said so far about Eastern Qi resonates with my Western knowledge of bioenergetics. To me, it is bioenergy, the energy of living things. It is about the second law of thermodynamics. It is about entropy[3] and dissipative structures. This is the Western equivalent of Qi.

Western Concepts of Energy

Human beings are living organisms and dissipative structures.[4] They need to have energy imported from the environment to sustain, grow, change and reproduce. According to the second law of thermodynamics, everything comes to a standstill, becomes disorganized, dead or in a state of equilibrium after reaching maximum entropy.

However, the second law of thermodynamics is classically applied to systems in closed states, systems that have no connection to the outside. But living structures are connected to the outside environment, importing energy in and sending products of consumption out. [5]

Energy has been part of the earth's environment since its beginning, when photons from sunlight, especially ultraviolet photons, provided the most useful energy. To receive and harness energy in this primordial time there was an abundance of water. Not only was water abundant, but it was also muddy with preorganic chemicals such as sulfur, phosphorus and ferrous iron. In this environment, energy provided by ultraviolet light harvested hydrogen through the following process. When ferrous iron in muddy water is excited by a photon of ultraviolet light, it releases an electron which combines with a free proton to give rise to a hydrogen atom.[6] Free protons exist in water as a result of spontaneous disassociation of water molecules into the positive ion H+ (which are protons) and the negative ion OH-. In pure water, only one molecule in ten million is disassociated.

This process resulted in cascades of electrons (hydrogen) invading the primitive chemistry, producing redox potentials in the reduction-oxidation process and leading the production of organic chemistry and amino acid.

The primitive chemistry consisted of carbon, hydrogen, nitrogen, oxygen and later phosphorus and sulfur (CHNOPS), subsequently adding more of the energized or potentiated hydrogen under the influence of electrical discharge and radiation, and these are reshuffled to produce amino acid as mentioned previously, and other biological components. These are the seeds of life in the atmosphere and space. The products of these chemical reshufflings gradually formed an organic blanket over the surface of our lifeless planet, later becoming thickened soup or paste in the fast evaporating lakes and lagoons.

The seed of life was saved from turning into paste somewhere across the primitive earth and headed towards complexification, thanks to energized hydrogen. The direction of this complexification was toward protein.

Proteins were the most important biological products, especially when they acted as catalytic agents and they were responsible for rapid chemical reactions which are considered to be important steps toward life.[7]

In living organisms, energy is brought into the body with food. Food has to go through the digestion process –breaking down complex proteins, fat, and carbohydrate to simple organic chemicals (a process called catabolism). After digestion, these chemicals must be sent to every cell of the body. The great complexity of metabolism takes place in the cell.

I stop here to describe something akin to Chinese Qi – hydrogen, energized greatly by the energy of the sun, especially by ultraviolet light. Hydrogen is everywhere in the cosmos, in the body, in matter. Ninety percent of matter consists of hydrogen. Its importance in health is seldom considered, rarely even mentioned.

People know that without oxygen we cannot survive. But, because hydrogen is so plentiful, we tend to forget about it. Really, it is essential to life more than anything else. Carbohydrates, fat, and protein are all capped with hydrogen. The DNA double helix bond is bridged by hydrogen. The energy brought in with food is ninety percent hydrogen. Hydrogen runs metabolism.

Metabolism is the process of converting energy and material brought in from outside into complex and ordered structures, containing more energy and to a more ordered (therefore less entropy) state.

Human beings, like all animals, are aerobic organisms, bringing in oxygen through respiration and food through alimentation. All aerobic organisms have mitochondria in their cells along with other organelles. Energy exchange through a process of hydrogen or electron transportation generally occurs along the inner surface of the mitochondrial wall and at certain points (flavins, quinones and cytochromes).

The energy exchange process is akin to the process of waterfalls harnessed to the running of a mill in the generation of electricity. It is termed oxidative phosphorylation because hydrogen “falls” into an oxygen acceptor, producing the substance adenosine triphosphate (ATP) by adding a phosphate bond to the substance adenosine diphosphate

(ADP). Because the process is essentially powered by protons, this is often called a proton pump.

According to Mitchell's chemiosmotic hypothesis,[8] electron transport and phosphorylation are not linked chemically but are coupled only by a transmembrane current of protons.

The electron-transport chain is a metabolic pathway arranged within and across the membrane to transport protons across it. Since the membrane has a low intrinsic conductance for protons (for ions in general), a gradient of pH and electrical potential will develop across the membrane. The free energy released by the electron-transport chain is thus transduced into, and stored as, an electrochemical potential of protons.

The ATP synthesis pathway is a second proton-translocation pathway – this one utilizing the proton potential to drive the phosphorylation of ADP.

The first pathway is called an "electron-driven proton pump" while the second is termed the "ATP-driven proton pump." [9] Here is what was novel in Mitchell's proposal: that ATP synthase, catalyzing an altogether different chemical reaction, was also a reversible proton-translocation device – and that these two transport systems were coupled together by the flow of their common substrate, the proton.

Making ATP is an endergonic reaction, a reaction which consumes energy, in this case requiring incoming hydrogen. Splitting ATP, or "hydrolyzing" ATP, is an exergonic reaction, a reaction in which hydrogen is given away.

ATP is actually a water remover concentrating other chemical reactions. For example, formation of thioester from thiols and acid, of peptides from amino acid, of nucleotide from phosphate, ribose and base, of RNA from nucleotide –all these require ATP as a concentrator. Here lies the secret of life: ATP concentrates and complexifies matter, and brings organization, order and concentrated energy, improves the standing of matter in hierarchy, evolving into having nucleotide, gene, and DNA.[10]

The metabolic web is so complex. Its control depends on metabolic feedback. The feedback loop is not random. Its control relies on the cell body's autonomous awareness and need which requires information. To acquire information, the cell body expends energy. Maxwell's demon exists only when you pay dues in the form of expenditures of energy. The flux of free energy corresponds to the rate of recycling of ATP into ADP and from ADP to ATP in oxidative phosphorylation. These are maintained in a steady state at far from equilibrium.

A stream of energy in the form of hydrogen conducts itself into complex organizations at the expense of the ceaseless work of ATP.

Yin and Yang

Let us now talk about Yin and Yang. This is the next most talked about subject, if not the most profound subject, in Eastern terminology. In English translation, Yin and Yang mean the shady side or the sunny side.

There were times when everything was nothing, what Buddha called Mu, nothingness. This is what the contemporary author David Bohm has called the implicate order.[11]

According *I Ching*, the Book of Changes[12] , from the symmetry of nothingness there occurred a "symmetry break" and Mu produced asymmetry, - and +,Yin and Yang or 0 and 1. From Yin and Yang come Old Yang and Young Yin and Old Yin and Young Yang. In other words, 2 became 4, 4 became 8 and then we have a multiplicity.

Everything is divided into Yin and Yang. Yang represents the sunny side, the strong plus side, positive things, the father figure. Yin is the opposite: the shady side, the weak negative side, the mother figure.

But Yin and Yang are not exclusive but complementary. They are not opposed to each other. They each produce each other. They are dynamically balanced, meaning they are balanced over time in a repeating cycle of change. Recall the symbol you see in Tai Chi showing Yin with a Yang spot inside and Yang with a Yin spot inside. This shows that both Yin and Yang contain the seed of the other.

The circular relationship of Yin and Yang is the budding of feedback relationships. The organizing pattern is more than the sum of its parts, and so the organization of a human body is more than the sum of each part, each organ. The organizing pattern is a product of feedback relationships. Being itself dynamically balanced, Yin and Yang are the forces leading to the dynamic balance of the body as a whole.

Yin and Yang and the Autonomic Nervous System

This leads to next subject: what is the counterpart of Yin and Yang in Western medicine? It is the autonomic nervous system.

What we have been discussing all seem to indicate the presence of an organizing principle in living things. I am not implying there are "vital forces" or an "invisible hand". Invisible it may be, yet it must be there to organize it . It has to be a balancer, like a ridge pole, elusive enough not to fall off, but sensible enough to be self corrective. It has to be present all over the body, not in one organ or one location, but ubiquitous. It has to be a sentinel guarding the body from harm from the outside and inside. All parts of the system have to be interconnected with each other. The system must be dynamic, like Yin and Yang, not contradictory but complementary. The system must be disguised enough to be associated with neurotransmitters, receptors, cytokines and hormones. The system must be the one overseeing these elusive messengers.

Let's see if and how the autonomic nervous system meets the above criteria.

The autonomic nervous system is everywhere although it was once thought to be distinct from the somatic nervous system. However, for convenience at this point I will use that traditional distinction.

The somatic nervous system is divided into the central and peripheral nervous system and controls the motor nerves of skeletal muscle and sensory function emanating from skin and the positional sense of skeletal muscle. The autonomic nervous system was thought to control the smooth muscles of the body, especially the intestine, cardiac smooth muscle and glands. Langley was the scientist who named the autonomic nervous system and classified it into sympathetic and parasympathetic systems. The hypothalamus was considered to be the center of the autonomic nervous system. [13]

Signals are relayed by substances known as neurotransmitters.[14] In preganglionic synapses, signals are relayed by nicotinic acetylcholine in both sympathetic and parasympathetic ganglia; muscarinic acetylcholine is the transmitter at postganglionic parasympathetic neuroeffector junctions, whereas at the neuroeffector junction of sympathetic nerves norepinephrine is the neurotransmitter. At one time Dale's law expressed the theory of "one neurotransmitter one synapse relation" Recently, however, many other transmitters or neuropeptides have been found like peptide enkephalin, vasoactive intestinal peptide, luteinizing hormone releasing hormone, and many other neurotransmitters.[15]

Recently again, these neurotransmitters and peptides have been found not only in the terminals of autonomic nerve synaptic endings but also in the central nervous system, the endocrine system and especially the immune system. A recent article shows adrenergic and cholinergic receptors are present in lymphocytes of both the B and T type. In another words, the autonomic system is present all over the body. Of course we know that somatic nerves are present throughout the body, and therefore it is legitimate to say that where there is a somatic nerve there is an autonomic nerve and vice versa.

The body is surrounded by and pervaded by the autonomic nervous system. The autonomic nervous system branches out into our systems, organs and cells. Relation of sympathetic and parasympathetic system is Yang and Yin, push and pull , + and -, and such action and reaction relationships are the important bases of feedback.

Living is an act of balance, not in the sense of mechanical balance but in dynamic balance, balance happening in living and complex systems. The autonomic system is made for achieving this dynamic balance. Dr. Becker suggested that the autonomic system evolved before the somatic nervous system. [16] The autonomic system is really a survival system for primitive creatures ranging from single celled animals (such as amoeba) to insects. A study of the autonomic system is the study of living phenomena, the study of how we evolved, how we survived harsh environments through a thousand million years.

Robert Becker in his experiments found that perineural cells accompany every part of the nervous system. Even the tiniest parts of sensory nerves in the skin which do not have a myelin covering are surrounded by a type of cell called Schwann cells. Such perineural structures are just as well distributed to integrate bodily processes as the nerves themselves. They reach into every area of the body to create a normal electrical environment around each cell or a stimulatory environment when healing growth is needed.

Moreover, according to Richard Gerber [17], Schwann and glial cell systems carry out both nutritional functions and electrical functions. Glial cell networks can transmit information via slow shifts in DC-current potentials. This is referred to as analog-based, as opposed to the digital pulse code of neural action potentials. The analog system of data transmission operates by varying the voltage of the cell membrane (the DC current membrane potential), where an upward or downward shift in cell voltage translates into a particular character and type of information that is relayed along the glial circuit. Analog transmission is known to be considerably slower than digital transmission but is recognized as an effective alternative form of data communication.

Before digital computers there were analog computers. These operated in exactly the way I believe the first living organisms did. Today, some of the most sophisticated computers are actually hybrid computers containing both analog and digital components.

Five Element Theory

Just as every phenomenon, every matter is divided into complementary Yin and Yang, Chinese philosophers divided and assigned every imaginable thing into five phases based upon the earth's elements, defined as fire, earth, metal, water and wood. These are not stationary elements but moving, transitory phases influencing each other, acting on or drawing from each other, in a circular relationship or feedback loop. Bodily functions are divided into Yin (solid) organs and Yang (hollow) organs. Each organ is associated with one of the 5 phases.

Liver and gallbladder are assigned to wood. Of these, the liver is the Yin (solid) organ and the gallbladder the Yang (hollow) organ. Heart and small intestine are assigned to fire. Of these, the heart is the Yin (solid) organ and the small intestine the Yang (hollow) organ. The functionally classified pericardium and "triple warmer" meridians are assigned to the fire phase, the former being the Yin solid organ and the latter the Yang hollow organ. The spleen and stomach are assigned to earth; spleen being the Yin solid organ , and the stomach the Yang hollow organ. Lung and large intestines are assigned to metal; lung being Yin, and large intestine, Yang. Kidney and bladder are assigned to water, kidney being Yin, and bladder being Yang.

How do these elements influence each other? For clarity we will pick just two of the many possible transformations.[18] (See diagram below).

In "tonification" or the creative cycle, wood makes fire; fire becomes earth (ashes); earth produces metal (gold ,diamond); metal becomes water (if melted); water helps wood (trees grow). These are obvious natural phenomena.

Let's take the "sedation" or the destruction cycle next. Wood breaks up the earth (plants can crack rock); earth destroys water (jug of earth prevents the spreading of water); water destroys fire (extinguishes fire); fire destroys metal (melts metal); metal destroys wood (by cutting). These are also obvious phenomena.

The interplay of the creative and destructive forces in the five elements is another aspect of that delicate balance of all life in the polarity of Yin and Yang mentioned earlier. When this balance is upset and an organ cannot react correctly to a stimulus, a disease results.

Certain of these relationships are reflected in the practice of our medicine. For example, tonification of the kidney (water) will produce increased excretion of water and solids. This leads to a tonification (decongestion) of liver, and also a sedation of the heart (fire) which no longer has to force too much fluid through the body.

If nothing is done when the heart is weak and failing, it will accumulate metabolites in the body resembling a blocked drainage system. Bodily functions stop and the person dies. Tonifying the heart increases the pumping action of the heart wall immediately. This demands more oxygen. Therefore the breathing action of lung must be deeper and faster. The enhanced activity of heart also increases the function of the kidney, bringing

the release of the accumulated metabolites. Because the heart muscle needs more energy (glycogen in addition to oxygen) the liver must also increase its action.

Richard Gerber also notes:

> If the Qi energies within an organ are not balanced, that organ becomes unable to complete its natural meridian circuit and may adversely affect its adjacent organ in the meridian series. This results in the so-called "Cycle of Destruction." [19]

In the case of congestive heart failure, for example, where damping of cardiac output results in pulmonary congestion through back pressure, this again affects the liver adversely and causes cellular damage in the liver.

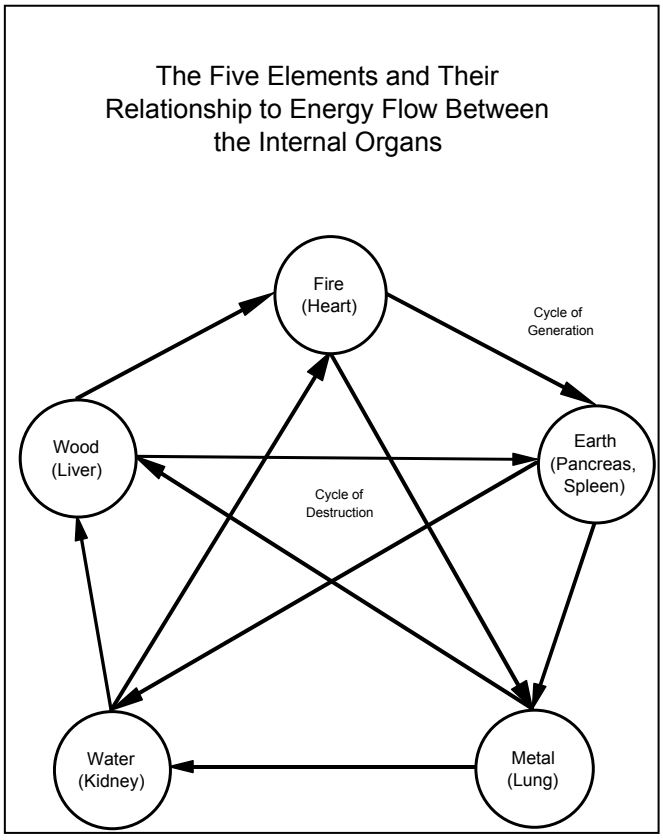
At the same time, in congestive heart failure, the failing right ventricle creates back pressure in the venous system and leads to venous congestion of the liver. If the situation becomes chronic, continued hepatic congestion leads to a type of cirrhosis called cardiac cirrhosis.

The cirrhosis of the liver creates further venous obstruction to the portocavel system and leads to portal hypertension and enlargement of the spleen, splenamegoly.

As Gerber notes,

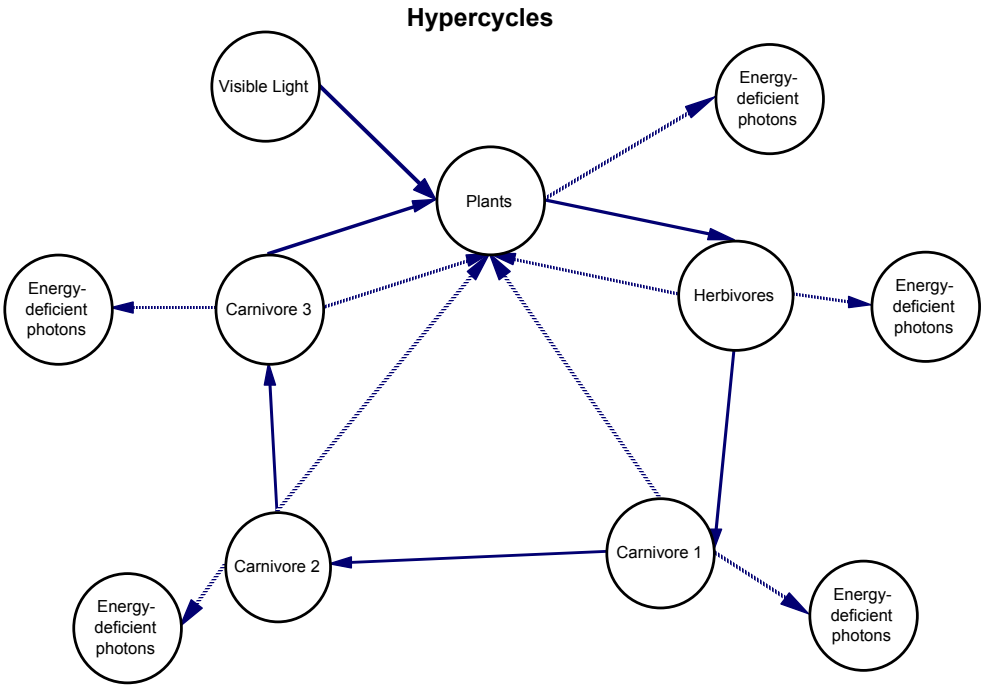
"It is fascinating to see how modern-day pathophysiology follows ancient Chinese principles of energy flow as demonstrated by the Cycle of Destruction. It is also interesting to note that these principles, which are thousands of years old, may add complementary insights to modern viewpoints of illness causation."[20]

These are expressions of physiological feedback processes, with the creative cycle being positive feedback and the destructive cycle being negative feedback.



These five phase transformation concepts are derivatives of Yin and Yang principles as stated previously. Yin and Yang complementarity is not linear but circular and inevitably leads to feedback.

Manfred Eigen[21] has explained his theory of hypercycles: In the primordial or prebiotic soup, polymers are formed by replication of simple monomers and by repeated replication and reiteration of their product to the macromolecules RNA and DNA, making the basis of information transfer possible and leading to the appearance and evolution of life.



A mature ecosystem is organized as a hypercycle of transformatory reactions in which all matter is recycled. The dotted arrows within the cycle indicate that also the metabolic end products, as well as the decay products after death, are recycled by the plants. Viewed as a whole, the cycle catalyzes the transformation of energy-rich photons in the region of visible light, into energy-deficient photons in the infrared or heat radiation region. See Eric Jantsch, *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution*. Oxford: Pergamon Press, 1980, p. 12.

Prigogine and DeDuve independently emphasize[22] that life is the product of molecular information transfer, the repeated copying of polynucleotides and polypeptides, in other words Yin and Yang complementation and transformation, assisted by catalysis and self-catalysis, in the environment far from equilibrium, facilitated by the process of metabolism and dissipative structure, leading to the self organization of the microscopic world.

We are products of this evolutionary replication, mutation and adaptive selection of feedback processes. You can not find the answer to how we heal, how we help heal disarrangement of our living bodies except through feedback processes. The five phase principle points to the recognition that healing entails feedback processes.

Taoism and Interconnectivity

One principle of Taoist thought[23] is that everything is interconnected. In modern physics Geoffrey Chew has advanced the notion that everything exists only by virtue of its consistency with everything else, which quite elegantly expresses much the same thing. Humberto Manturana[24] says the same thing when he describes living things as autopoeitic networks, producing each other as the organism grows.

Acupuncture stimulates the autonomic nervous system which is spread out into every node of our web of organs and, vigilant to external and internal perturbations, helps to maintain Yin and Yang balance.

Recent developments in biochemistry and cell molecular biology that merit our attention are research regarding the development of G proteins and the dual control of adenyl cyclase and protein phosphorelation. These are intimately related to the cAMP and cGMP cycle and cell membrane information exchange in the eukaryocyte.[25]

When receptors for large number of hormones, neurotransmitters and other regulatory molecules interact with appropriate endogenous ligand at the cell surface, these interactions result in stimulation or inhibition of adenyl cyclase activity owing to stimulatory or inhibitory action of protein Gs or Gi respectively, followed by alteration of intracellular phosphorelation as a consequence of action of cAMP dependent protein kinase and counter regulatory phosphoprotein phosphates.[26]

Cell membranes are studded with multiple receptors ever ready to meet and respond to external signals through circulating hormones or neighboring hormones. Signals dart through or are checked through inside the cell to second messenger or to effectors, eliciting cascades of catalytic changes leading to genetic responses inside the nucleus and after transcription of DNA to messenger RNA and translation of messenger RNA to necessary protein.

Taoism regards the universe as one, self-contained with eternal transformation of Yin and Yang. Everything is interconnected and self-consistent. The universe consists of macrocosm and microcosm; the human body being the microcosm, itself becoming the macrocosm in relation to part of body and the part of the body becoming microcosm.

According to Eric Jantsch,[27] evolution differentiates by means of co-evolution of macrocosmic and microcosmic systems. This systemic world view further states that micro and macrocosms are both aspects of the same unified and unifying evolution

In the West, especially in the old physics, the old tradition of breaking complex things down into simple constituents is so deeply ingrained that the search for these basic things continues . On the other hand, in modern physics, the existence of elementary particles is thought to be unlikely and theories reveal a basic interconnectedness of matter, showing that particles are processes rather than objects and the energy of motion can be transformed into mass.[28]

According to Capra,[29] in the new world view, the universe is seen as a dynamic web of interrelated events. No property of any of this web is fundamental, they all follow from the properties of other parts and the overall consistency of their mutual relation determine the structure of the entire web.

In the Eastern view, as in the view of modern physics, everything in the universe is connected to everything else and no part of it is fundamental. The properties of any part are determined not by some fundamental law but by the properties of all the other parts. The Eastern view also denies that there is any fundamental constituent of matter. In a universe which is an inseparable whole and where all forms are fluid and ever changing, there is no room for any fixed fundamental entity.

The Way of Healing

Twenty-five years ago, when I said that acupuncture works through the body's immune system, it was a laughable thing to say. The immune system was considered a sanctuary, a closed system and auto-regulated.. Nowadays, every healing system includes the immune system as a healing mode. Laughing improves the immune system, helping cancer to heal, according to the late Norman Cousins.[30] Natural healers and shamans heal souls by improving the immune system.

Yogi and Tai Chi master improve stamina and the immune system, through rigorous discipline thus attaining a healthier body. Massage and healing touch also emphasize the immune system. Prayer and meditation are included as a means of gathering healing strength through the immune system.

All the above are ways of influencing the higher brain, the cerebral cortex, by means of consciousness. The higher cortical junctions exert influences on the hypothalamus, which is the center of the autonomic nervous system. The autonomic nervous system then gives the signal to the immune system to harmonize the body's healing system.

Numerous articles have recently appeared in the New England Journal of Medicine and Science explaining disease in connection with the hypothalamus. Not only is the hypothalamus the center of the autonomic nervous system, but many bodily functions appear anchored to it. These include brain function and the conscious mind; and many endocrine functions which work through the pituitary. Often these pituitary functions have their own feedback loops.

Note the amazing discovery in recent years of the interconnectedness[31] of the nervous system (somatic and autonomic nervous system) and endocrine system (pituitary, thymus, thyroid, testes, and ovary etc.) and immune system (thymus, lymph glands , bone marrow and antibody etc.) Neurohormones, neurotransmitters, hormone peptides , endocrine peptides and cytokines are found everywhere. Receptors of these are also ubiquitously present in every organ including the neuroendocrine system and immune system, and also amazingly in skin, subcutaneous tissue, mucous membrane and gut and respiratory system. Many regulatory peptides and their receptors previously thought to be limited to the brain or immune system are now known to be expressed by both.

We have not wasted time to discuss the teachings of Eastern religions regarding the interconnectedness of myriads of things. Everything in the cosmos balances dynamically in the Yin and Yang polarity, in accord with movement, growth, change, and transformation, characteristics of all living things.

Both Eastern and Western thinkers view the human organism as an interconnected whole. The nervous system is interconnected with the hormonal system, the endocrine system, the respiratory system, the cardiovascular system and so on. The immune system is interconnected to all of these as well. In a sense, every cell is part of the immune system. Every cell fluctuates with each other constantly in dynamic waves of negative and positive feedback.

Thus, feedback processes provide the mechanism that threads together complex biological phenomenon. Biological phenomenon require, in addition to negative

cybernetics, positive feedback to stabilize the endless chaotic process of biology into the evolving order.

Local acupuncture stimulus evokes a chain of events. Local tissue stimulation stirs disturbances in the tissue producing micro-inflammation. Mediators[32] of the inflammation convey a message to the center of the autonomic nervous which decodes the message received and proceeds with feedback to related organs and targets. The body's interconnected systems come into play.

Life is the manifestation of the rhythm of the moon and sun and the cosmos. Life is rhythm. Our body is attuned to the geomagnetic rhythm of cosmos. Cells, molecules, RNA and DNA dance to the rhythm of life. The Chinese have treasured nature's rhythm ever since they discovered nature and medicine. When nature is out of rhythm, there is the seed of disease. To bring the disordered into balance, into rhythm, is to bring about health.

The ability to generate a stimulus and evoke a cascade of events is at the heart of acupuncture. Because the body's feedback cycles are so attuned to respond, because everything is interconnected, because life tends towards rhythm and balance, tiny needles can evoke a profound healing response.

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[3] Gregoire Nicolis, Ilya Prigogine, *Exploring Complexity: An Introduction*, New York: WH Freeman and Co. 1989. p.62.

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[4] Fritjof Capra, *The Web of Life: A New Scientific Understanding of Living Systems.* New York: Anchor Books, 1996. p. 181.

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[5] Id.

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