

# **Intercultural Incommensurability and the Globalization Of Chinese Medicine: The Case Of Acupuncture**

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## **Abstract**

It is normally assumed that the globalization of medical practice emanates from the West, but the Chinese practice of acupuncture has proven this hypothesis incorrect. Western medicine has not rejected the concept of acupuncture. It has embraced it and has investigated the benefits that such practices provide. Since Western medicine is already framed within the epistemological context of germ theory, the problem becomes one of finding a way in which such a disparate tradition can be incorporated into current models of medicine. The explanation of this journey begins with Kuhn's theory of scientific revolutions and how that model constitutes modern scientific practice. The germ theory of modern medicine is introduced and compared to the Chinese medical model of acupuncture. The incommensurability between those two models is discussed within the context of the globalization of Chinese medicine. It is argued that instead of rejecting such practices, modern medicine has incorporated them into a new theory which they call medical acupuncture, a model concomitant with the tenets of western scientific research.

## **Introduction**

The globalization of medicine began in Greece, was developed in Europe and spread through out the modern world. There is one scenario in this

process that merits special consideration. Contributions to medicine in the form of Chinese acupuncture demonstrate how the globalization of medicine is not always unidirectional. For example, modern medicine has accepted the practice of acupuncture and has integrated into its own theoretical framework. This journey from one cultural system to another and from one set of theoretical practices to another merits discussion for several reasons. One of them has to do with the philosophy of science and the concept of incommensurability between medical systems. The concept of scientific change in the form of theoretical revolutions is reviewed and it is argued that Chinese medicine with its practice of acupuncture is not compatible with the germ theory of western medicine. Thomas Kuhn (1970; Lakatos and Musgrave, 1970) referred to this as the incommensurability thesis. He proposed ways in which such differences can be resolved within the new paradigm of revolutionary science. That process of resolving intercultural incommensurability within the medical sciences is the focus of this paper. It includes an overview of Kuhn's theory of the philosophy of science, a discussion of modern germ theory, an overview of acupuncture theory, and the resolution of those conflicts within modern medicine.

### **The Structure of Scientific Change**

One of the most influential scholars in the historiography of science was Thomas Kuhn. After completing his doctorate in physics, Kuhn had the opportunity to teach a class in science for undergraduates in the humanities. This was part of the General Education in Science curriculum developed by James H. Conant, the President of Harvard University. It was this experience that led Kuhn into the historiography of physics and the philosophy of science. Later in life, Kuhn became a full professor at the University of California where he discussed his ideas with his colleagues in philosophy and later he published his research a book on *The Structure of Scientific Revolutions* (1962). While discussing the philosophy of science with his colleagues at Berkeley, Kuhn became intrigued by the works of Butterfield in England and Koyré in France (Hanson, 1958; Nash, 1964). Both philosophers had argued for a new model of science in which the changes that take place in science are not due to the mere accretion of new knowledge added on to old knowledge, but a model in which major periods of scientific change were

revolutionary in nature. Kuhn had done research earlier on the Copernican Revolution while teaching at Harvard and drew insight into the nature of scientific revolutions from his ventures into the philosophy of science. When Kuhn published his *Structure of Scientific Revolutions*, it caused an epistemic rupture among scientists. Everyone was quoting Thomas Kuhn. Even Chomsky (1965) mentioned him favorably in *Aspects of the Theory of Syntax*. The impact of Kuhn’s theory of science since that time has been phenomenal; He has dominated the citation index. He led the list and was the most quoted scholar before his demise.

<b>The Structure of Scientific Change</b>		
Normal Science	The golden age	Old journals reject papers that do not confirm normal science views
Period of Crisis	Loss of belief in the old paradigm	Journals accept a wide range of articles that attempt to repair and revise the normal science model
Revolutionary Science	Community of scientists shift to the new emerging paradigm	New journals reflect the revolutionary changes in science. Eventually older journals are taken over by the leaders of the new paradigm

Table 1: The Structure of Scientific Change

What is Kuhn’s theory of scientific revolutions and why is it so important? Kuhn noted that there are cycles of change within the sciences and that these cycles are structured and they repeat themselves at regular intervals with the passage of time. In physics, for example, the revolutions came every three hundred years. Now that more and more scientists are working on the same ideas, these revolutions are beginning to appear more frequently. The first period in the history of scientific change is known as *normal science*. Kuhn depicts this as the golden age of a science. It is a time when one takes pride in the great achievements of the past. Scientists argue that they have just about solved all of the problems in their research and that they will soon nothing left to discover. Kuhn noted that there are several characteristics that mark this period. One of them has to do with publications. It turns out that new ideas are rejected during such times of intellectual contentment. Grants during such a period of normality obviously attempt to reiterate common knowledge. Anyone who proposes anything new or different will have his funding rejected.

The golden age of science, as Kuhn explained, cannot last forever. With the passage of time, the practitioners in the field will note more and

more anomalies. Definitions will fail to adequately describe events. There will be inconsistencies within the various parts of a theoretical model. Experiments will fail from time to time. In such instances, the theories are never questioned, only the methodology of the laboratory workers. As these anomalies mount, the scientific community will become more and more restless and at some point scholars will begin to talk about them openly at national conferences, in graduate seminars, and in their publications. When this shift takes place, the next level in the structure of scientific progress takes place. This new stage is called the *period of crisis*. Kuhn referred to “crisis” in the singular, but such is not the case. More than one crisis occurs. Many different attempts to solve the conflict may occur during this time. In linguistics, for example, there were nearly a dozen such conflicting models of neo-structuralism during this period of crises. There are certain characteristics which define this period or stage of development in the progress of a discipline. At such a time, new ideas are openly accepted and entertained. It is a time for exploratory discussions about what is wrong with the old model and what possible changes could or should take place. Editors openly look for new ideas and suggestions for their journals. Granting agencies entertain new models of research for funding. It is a time when people within the scientific community have open attitudes towards problem solving. It is important to note that what makes the natural sciences different from what has been called the human sciences (i.e., the humanities) is this attitude of problem solving. Scientists never complain about what is wrong with a theory, they keep their controversial ideas in abeyance. It is only when they think that they have a solution that they openly point out the anomalies in the older model and propose new solutions to old problems. Kuhn argues that science is all about problem solving. The search for solutions provides the driving force behind scientific research and theory building.

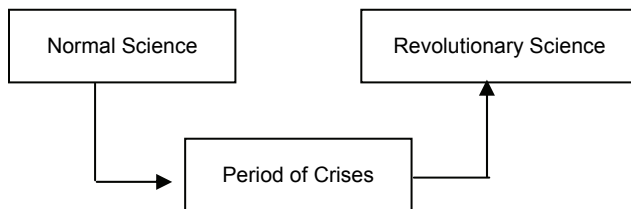


Figure 1 The Structure of Revolutionary Science

The next stage in the development of scientific progress comes about when one of the competing models from the period of crises is hailed for its success in problem solving. When this event occurs, the scientific community encounters a *period of scientific revolution*. Such a model or theory is accepted by the scientific community because it is successful in solving the very problems that plagued other scientists.

### **The Commensurability of Divergent Paradigms**

In 1964, Kuhn left the University of California to accept a position as a professor of the philosophy of science at Princeton University. In the following year, he attended a Philosophy of Science conference in London in which Kuhn there were position papers and debates among several noted scholars in this field. A debate was scheduled to take place between Kuhn, Paul Feyerabend and Imre Lakatos. Unfortunately, Feyerabend and Lakatos were not in attendance and the debate centered on Kuhn and Popper. The results were published a few years later (Lakatos and Musgrave, 1970). In the same year as the Lakatos and Musgrave volume was printed, Kuhn issued the second edition of his book. What made this later edition significant was the addition of his postscript which clarified his concept of scientific paradigms.

A mature science, according to Kuhn (1970), experiences alternating phases of normal science and revolutions. These alternating phases are paradigms and Kuhn argues that it is the most misunderstood aspect of his book (Kuhn, 1962). Scientific paradigms have the consensus of a disciplinary matrix that function as exemplars. Immature sciences lack this consensus and consequently there is little opportunity for progress. In mature sciences a great amount of intellectual energy is invested in arguing over fundamentals. Once these fundamentals are accepted, further scientific progress is made. This success is due to the fact that energy is no longer spent arguing with competing models over fundamentals. Scientific paradigms are about solving problems and this is one of the characteristics of a mature science. It is also able to envision new problems, suggest approaches to those problems, and provide a standard by which such puzzles can be articulated and tested. The scientific method used within a paradigm encapsulates the rules of scientific rationality. One of the problems raised by paradigmatic thinking has to do with incommensurability. This occurs when puzzle-solutions from different

eras of normal science are evaluated and referenced to different paradigms. These solutions depend on the particular kind of disciplinary matrix within which the scientist is working. Kuhn (1977) argues that what holds a scientific theory together are five shared characteristics: accuracy, consistency scope that extends beyond the data, simplicity, and the potentiality for further research. Paradigms that are not commensurate with each other are of three kinds: the observational evidence cannot provide a common basis for theory comparison, theories from different periods or cultures may not be inter-translatable and this creates obstacles to commensurability, and methodological in which there is no common methods of comparison and evaluation between scientific models. Before discussing these factors, it is important to review how western medicine defines illness and how this differs from the medicinal traditions of Chinese medicine.

### **The Western Medicine Paradigm**

The earliest model of disease in the West goes back to Hippocrates (460 BC to 330 BC). It was a model based on the concept of the four humors (blood, phlegm, yellow bile, and black bile). Health, according to Hippocrates occurs when these four substances are in correct portion to each other. If one of them is too hot or too dry, such a condition results in disease (Lloyd, 1978). For many centuries, it was believed that disease arose from humoral imbalances. Too much bile can cause fever; too much phlegm can cause epilepsy or angina. A typical treatment for such disease involved the use of emetics, purgatives, and phlebotomy. This model of disease began to change with the contagion theory of Fracastoro in 1560 (Fracastorius, 1930). Disease according to this modification in Humor Theory was caused by *sememinaria* (seedlets) of contagion. These seeds or germs was the earliest form of Germ Theory but it was unfortunately still tied to Humor Theory. It was not until Louis Pasteur began his study of fermentation in the 1850s that evidence for germs in the form of bacteria was shown to be the cause of infectious disease. Pasteur proved that fermentation and putrefaction were not due to spontaneous generation. Pasteur, for example, demonstrated that the fermentation of beer was caused by the bacteria in yeast. Joseph Lister, a British surgeon, agreed with Pasteur and went on to demonstrate how micro-organisms are the cause of a range of diseases (Thagard, 1996: 454). Lister used carbolic

acid to sterilize the wounds of his patients and infections dropped dramatically. By 1980, Robert Koch demonstrated how anthrax (*bacillus anthracis*) and tuberculosis (*mycobacterium tuberculosis*) were caused by bacteria. It was at this time that researchers came to the realization that microbes smaller than bacteria were responsible to rabies and other diseases. The investigation of these microbes led to the discovery of viruses.

Modern diseases are classified according to the physiological systems in which they occur and according to their causes (Thagard, 1998). Hence, diseases are classified in terms of causal networks and these networks represent relations among the symptoms, the causes, and the treatment of a disease. X is a disease if and only if conditions Y and Z occur (Reznek, 1987).

Four Kinds of Diseases		
Kind of Disease	Subcategories	Example
Infectious Disease	Bacterial	Lyme
	Viral	influenza
Nutritional Disease		Beriberi
		Scurvy
Molecular-genetic Disease	Mendelian	Cystic fibrosis
	Multifactorial	cancer
Auto Immune Disease		Lupus

Table 2: Cateorization of Germ Theory

Obviously symptoms are observable manifestations of a disease which develop over time and in accordance with particular configurations. A disease is due to a specific etiology. Treatment of the disease should affect the symptoms and the causal factors that produced those symptoms. For example, tuberculosis shows certain symptoms such as coughing and the growth of tubercles or nodules in the lung leading to a wasting of the body and death. The cause of this disease is the bacterium and later another physician, Gerhard Domagk, discovered that the bacterium (*mycobacterium tuberculosis*) could be killed by Prontosil. The whole set of interactions function as a causal network. These causal structures constitute modern germ theory.

## Chinese Traditional Medicine

The foundations of Chinese medicine are based on careful observations of natural phenomena by Daoist masters over 3,000 years ago. The Dao, it is argued, is the ultimate source and substance of all things, living and non-living (Mitchell, 1988). It is invisible, boundless, and inexhaustible. All things come from the Dao and ultimately return to it. Hence, the Dao refers to a very primal force within; it refers to the motivating forces behind all things; it refers to the orderly way in which these things unfold. This is why this word is sometimes translated as “The Path” or “The Way.” The early classic Daoist treatise, *Dao de Jing* (Tao the Ching) is called the “Book of the Way.”



Figure 2 The World of *Dao*

This book was written around the 5th century BCE by Lao-tsu, an older contemporary of Confucius. His name is translated as “Old Master.” Lao-tsu documented the principles of the Dao, the way to live and the way to be. What the Dao explicates is the claim that all things and events are contextualized. Things do not exist in isolation. They are always in relation to other things. Human beings depend on their environment for life itself. Life is always embodied (Rodriguez et al, 2005). Human beings evolved on earth under the same universal laws and primal forces. These are the same forces that constitute the five movements of phases along the path or *Wuxing*. Modern physicist relate these to the four forces of gravity, electromagnetism, weak and strong nuclear forces (Howson et al, 1982).. Since the most ancient roots of Daoism, the Chinese considered matter as nothing more than another variety of energy or Qi. These forces constitute the Five Element Theory of Chinese medicine (Fire, Earth, Metal, Water, and Wood) with its system of checks and balances. There is a generating cycle (*sheng*) and a controlling cycle (*ke*). These react with the insulting cycle (*wu*) and the overacting cycle (*cheng*). This interaction of fire, earth,

metal, water and wood are comparable to the theory of the Four Humors of Hippocrates except that this system is far more sophisticated. It contains acupuncture points throughout the body that are aligned as Ying Yang oppositions and pathways that connect them known as meridians. *Qi* refers to an energy flow within these meridians. It is a bio-electric energy and when there is stagnation, a lack of energy flow in the body, the result is disease.



Figure 3 *Qi*

### **Paradigmatic Incommensurability**

How does one reconcile the germ theory of medicine with its causal complexes with the Five Element Theory of Chinese medicine? From the perspective of western medicine, the Chinese philosophy of science is based on a system of homeostasis, a balancing of *yin* and *yang*, (passive and aggressive; inside and outside; dark and light; feminine and masculine; blood and energy; anatomy and physiology). These terms are used metaphorically. As the sun moves over a hill, it produces two simultaneous conditions. The sunny side of the hill is called *yang* and the shady side is called *yin*. Life cannot be sustained by only living in the light or in darkness; it requires a balance between them.

One of the areas of incommensurability between these two systems exists in the contrast of scientific reductionism and the holistic approach in alternative medical practice. Western science functions in a context of reductionism, linearity, and causality. Individual events are isolated from their larger and more holistic complex of interactions and subjected to the scientific method. Hypotheses are posed regarding these isolated events and experiments are designed to either prove or disprove these hypotheses. From this practice, laws or principles are established and theories are formulated that verify and predict those very principles. It is a quantitative

science. Chinese science, on the other hand, is a qualitative science. It is holistic in that it is derived from a context of inclusion, concurrence, and induction. Events are seen as initially interconnected; they influence each other. These events are studied in context with its interrelationships and counter influences. Upon observing the phenomena, laws are established based on how these events are experienced. Are these two systems incommensurate? They both make conclusions about the same phenomena. However, western medicine the approach to theory building espoused by traditional Chinese medicine because it is non-technical and qualitative. They cannot understand why the Chinese felt no compunction to quantify phenomena. They cannot relate to the qualitative measures used by the Chinese philosophers (*Yin, Yang, wuxing, and baqua*). They are not comfortable with the metaphor of the path or the way and prefer to seek causal relationships of a different nature.

### **Medical Acupuncture**

When Thomas Kuhn (1970) claimed that some scientific paradigms may be incommensurable with each other, he had in mind the fact that they may differ in their lexicon as evidenced in the models being discussed. He noted that these paradigms could also be embedded in different research traditions as also evidenced in the models being discussed. However, the most threatening of all forms of incommensurability occurred ontologically. This occurs when two conflicting paradigms have disparate beliefs about reality and because they have different beliefs, they also develop different epistemologies. Is this the case with modern medical science and classical Chinese medicine? There are many who would argue that such models are not really incommensurable if they are investigated from the perspective of electrophysiology.

The most promising bridge between these two paradigms can be found in the field of bioelectromagnetism (BEM) which is the study of the subtle electromagnetic fields that underlie life processes. BEM is a viable research paradigm in Europe and it is not widely investigated within the United States (Selden and Becker, 1987) where medical treatments are largely based on drug therapies and surgical interventions. Lakhovsky (1992) investigated the interrelationships between high-frequency electromagnetic fields and living things. In this book, he asked the question: "What is life?" His response is that life is the harmony of

multiple radiations which react upon one another. He then went on to ask: “What is disease?” His answer was that disease was the oscillatory disequilibrium of cells and that this disequilibrium originated from external causes. Lakhovsky explained that living things receive and emit electromagnetic radiations. It is the exchange of these energies between life forms constitutes electromagnetic communication. Pressman (1970), a Russian scientist, argued that it is electromagnetic radiation that enables living things to sense information about the environment, facilitate and control within the organism, and communicate between living things. Popp and Becker (1988) referred to this energy forms as biotons and explained how they regulate many physiological functions such as growth, maturation, cell differentiation, enzymatic activity, and immune system functions. This electromagnetic fields within the human body is seen as a model of resonance in which particles move harmoniously through an electromagnetic field This research is reminiscent of quantum physics which is based on the principle that all parts of the universe are connected to each other and are in communication with all of its parts. The ancient Chinese description of *Qi* and its pathways and accumulations in the body closely correlate with research in BEM. The acupuncture system with its meridians is largely based on such electromagnetic energies.

Scholars working in BEM research have noted that some points on the body were more conductive than others to a 12-volt current that was applied to the skin. These low-resistance spots are good electro-permeable points. These acupoints are 50% more conductive and function as capacitors in that they hold and store electrical energy within the body. This research notes that the potential between these points are concomitant with the concept of meridians in the human body as described by classical Chinese medicine. Scientists have used the “beaver dam” metaphor to explain how these electrical currents function in the body by holding energies back and releasing them to create surges of electrical force. Bjorn Nordenstrom (1989), a Swedish radiologist, has successfully used the BEM model of energy medicine to treat cancer. He considers the meridian system to be a vascular-interstitial closed circuit that is powered by imbalances of positive and negative ionic charges over long distances within the body. Cancer cells, he noted, are more sensitive to electrical energy than healthy ones and they are more sensitive to the use of externally applied currents. Nordenstrom placed the positive pole of the galvanic stimulator on the tumor and the negative one some distance away. This causes the tumor to become dehydrated through electro-osmosis.

Semi-conduction and Piezo-electricity are two electrical qualities of crystalline substances that occur in the human body. Both are highly relevant to the understanding of the electrical qualities that occur within the meridian system. Szent-Gyorgyi (Selden and Becker, 1987) was the first to point out that the molecular structures of the human body are organized to support semi-conduction by passing information along chains of protein molecules.

Traditional Chinese Medicine and modern medical science are not incommensurable if one views current germ theory from the perspective of BEM research. The secret to avoiding incommensurability within the historiography of medical science is through the adjustment of epistemological views so that they will be more consistent with ontological ones.

### **Concluding Remarks**

The globalization of medicine has taken an interesting turn. Classical Chinese medicine has made its journey outside of the Middle Kingdom and into the medical practice of the western nations. One of the major problems with this transition had to do with paradigmatic incommensurability. Even though the languages involved were different and even though the medical practices differed substantially, the two models were found to be commensurable because of scholars who understood the significance of the Chinese tradition and its implications for BEM research. One is reminded that when paradigms overlap, they become partially compatible and their findings can be made more commensurable with each other. Such commensurability, however, would not have occurred if such peripheral practices were not tolerated by the core medical sciences. Tolerance has its virtues.

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