

# When Scientific Laws and Findings Encounter Life: A Traditional Chinese Medicine Perspective

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**Abstract**—This paper is to point out the limitations of modern medical research and why the Traditional Chinese Medicine (TCM) can help address the limitations. Many of the modern medical research results are based on the findings in fundamental research disciplines, such as physics, and chemistry. However, this foundation is not as solid as it seems. The theory proposed in this paper, the Law of Chasm, or the Chasm Theory, states that there are two categories of objects to be studied. One is non-life objects, or lifeless objects; the other is living beings, or the objects that are alive. The laws and findings obtained by studying non-life objects may not all be extended to living beings, and vice versa. TCM is the study of medicine based on living beings. Therefore, TCM findings may not exist in the body of the knowledge obtained from studying non-life objects.

**Keywords**—TCM, Traditional Chinese Medicine, Law of Chasm, Chasm Theory, living-beings, non-life.

## I. INTRODUCTION

SCIENTIFIC laws and findings are the foundations of modern medical research. For instance, a medical x-ray machine is an application of the study on electromagnetic radiation. Computed Tomography (CT) scan is based on the advancement in both x-ray and computer technologies. However, there is an increasing concern that most current published research findings are false. This concern can limit the impacts of modern medical research. In this paper, we propose that there is a fundamental cause of the limitations in medical research. This cause is rooted in the scientific research approach itself, and it is not due to such factors as measurement errors.

## II. CURRENT LIMITATIONS

In his essay, Prof. Ioannidis pointed out that “There is increasing concern that most current published research findings are false.” [1] and he further noted that “It can be proven that most claimed research findings are false.” Besides the reasons elucidated by Prof. Ioannidis, this paper proposes that there is a deeper cause: the scientific laws obtained by studying lifeless objects may not work with living beings.

Let us examine some examples. Fick’s law of diffusion is one of the physics laws taught in schools. It describes the diffusion process, the movement of molecules from higher concentration to lower concentration region, as shown in (1):

$$J = -D \frac{d\phi}{dx} \quad (1)$$

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Here  $J$ : diffusion flux;  $D$ : diffusivity;  $\phi$ : concentration;  $x$ : distance.

This law works well in the world of non-life objects but breaks at the presence of life. One live fish can prove Fick’s laws of diffusion false. For example, salmon fishes live in salty sea water. However, their flesh is not salty as long as they are alive, even though the salinity of the sea water around the fishes is much higher than the salinity in the bodies of the fishes, otherwise, we will be all eating salty salmons. As long as the fishes are alive, the Fick’s law is no longer true. Once a fish is dead, it becomes a non-life object, the Fick’s law of diffusion works. It can be verified by immersing the dead fish in a container of sea water for a while. The result is a salty fish. This is similar to the process of marinating foods to get the taste and flavor from the seasonings.

The breakdown of Fick’s law not only happens to fishes, but also to other living beings in ocean such as shrimps and crabs that are consumed around the world. As long as they are alive, the salinity of their meat is much lower than that of the surrounding sea water. One may think that this is because the existence of a barrier such as skin or shell, the high salinity concentration is prevented from entering the body of the living being. But this is not true as such a barrier also exists after the living-being is dead.

Applying Fick’s law in medical study can overly simplify the human biological process. For instance, it is a popular knowledge that drinking water can “thin” blood and reduce the risk of blood clot. This can be understood by applying Fick’s law to blood. However, the blood thinning does not happen by drinking more water. The additional water does not diffuse into the blood to make it thin. It is a very complicated biological process on live human beings to assimilate the water, to make it a part of the bodily fluid such as blood.

There is no evidence that Fick’s law is the only scientific law that breaks at the presence of life. Let us examine the next example. In physics classes, we learned that to heat water, it takes one calorie for a gram of water to rise one degree centigrade in temperature. To melt ice, it takes 80 calories per gram. In another word, it takes 80 times more calories to melt ice than to heat up water.

It is popular health knowledge that in order to lose weight, one needs to consume, or “burn off” more calories. Many believe that this can be achieved by drinking ice water, based on the above-mentioned scientific finding. However, this scientific finding yields different result in the presence of life. If drinking ice water can make a person to consume more calories and thus to lose weight, it stands to reason that people who live in cold region are far skinnier than people who live in warm

region. But the reality shows the opposite. For example, the creatures living in cold region usually have significantly more body fat than creatures in warm region, even though the creatures living in cold region consume more calories to stay warm. The creatures living in warm region consume fewer calories, but they have less body fat. Therefore, drinking ice water cannot lose weight; it will do the opposite by increasing body weight. In fact, this can explain a possible cause of obesity. Of course, the entire process of losing or increasing body weight is extremely complex, and consuming calories is only one of the factors that can impact body weight. The example here only discusses one aspect of this complex process.

Let us examine another scientific finding. In chemistry, an acid that has pH value of 2 is a strong acid. It can dissolve metal, among other objects. Human stomach acid has a pH value between 1.5 and 3.5. It can dissolve a small piece of metal that by accident entered the GI track. But this strong stomach acid does not corrode stomach muscle, as long as we are alive. In the presence of life, the chemistry process of corrosion works selectively. The stomach acid dissolves food but does not dissolve the lining of the stomach itself.

### III. THE LAW OF CHASM

No evidence indicates that the three scientific laws and findings above are the only ones that break at the presence of life. Readers are encouraged to examine the scientific laws and findings in their fields of interests. A logical next question is why these laws and findings fail at the presence of life.

This paper proposes the Law of Chasm, also called the Chasm Theory: there is a bottomless chasm between living beings and non-life objects, in the sense that the scientific laws and findings obtained by studying the objects on the non-life (NL) side of the chasm may not hold true at the living beings (LB) side of the chasm, and vice versa, see Fig. 1.

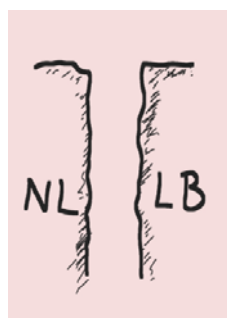


Fig. 1 Illustration of the Chasm Theory between NL and LB

In contrast to the modern medical study which is built largely upon the laws and findings at the NL side of the chasm, TCM theory is based on findings of studies at the LB side of the chasm. About 4000 years ago, at the time that TCM theory was developed, there were no disciplines such as physics and chemistry as there are today, nor the scientific laws as we know today. Therefore, TCM could not base its theory on the findings of physics or chemistry or any of these disciplines. TCM's

approach is to study living human beings. Its findings were obtained from living human beings. In other words, they came from the LB side of the chasm. This approach afforded its insights about the process of life that Western medical research could not have by dissecting cadavers, resulting in the situation that TCM has findings not found in Western medicine, the incompatibility between TCM and Western medicine.

This incompatibility is so severe that it often leads to two views about TCM. One is the total dismissal of TCM. The other is either trying to fit Western medicine concepts into TCM concepts or trying to fit TCM concepts into Western medicine concepts. Neither is fruitful, as Harvard Medical School Prof. Kaptchuk pointed out, "Intellectually, the way to approach Chinese concepts is to see whether they are internally logical and consistent, not to disguise them as Western concepts or dismiss them because they do not conform to Western notions. And the system is internally consistent" [2].

The Chasm Theory can explain the fundamental reason that caused this incompatibility. For instance, the existence of meridians is a fundamental concept in TCM, but it is not found in Western medicine. In TCM, meridians are the primary pathways that the energy of life flows through. They only exist in living beings. Once the beings are dead, there are no meridians can be found by studying the corpses. Therefore, they do not exist in Western medicine textbooks.

In clinics, acupuncturists around the world are using acupuncture points to treat patients every day with remarkable effectiveness as documented by the World Health Organization in 2002 [3]. There are hundreds of these points all over a human body. They are described in great details in the classics of TCM text books thousands of years ago. However, the existence of acupuncture points is absent in Western medicine. Same as meridians, these points only exist in live human beings. They cannot be observed by dissecting cadavers.

Chi (or Qi) is another TCM finding that does not exist in Western medicine (Chi or Qi are referring to the same Chinese character 气). Chi is the energy that keeps a living-being alive. Once the Chi is gone, the being is dead, or once the being is dead, Chi can no longer be detected from the dead being. In acupuncture treatment sessions, patients can experience a process called De-Chi. De-Chi refers to the patient's subjective sensation of the movement of Chi and objective body responses. It also refers to the acupuncturist's observation while the acupuncturist needles are in certain acupuncture points in the patient's body. This experience can only be observed on a living-being.

It is important to note that the Chasm Theory does not mean that all scientific laws discovered at the NL side of the Chasm fail at the LB side of the Chasm, nor all findings at the LB side of the Chasm all fail at the NL side of the Chasm. For instance, the law of gravity applies to non-living objects as well as living-beings, and the phenomenon of meridian can be observed by using the technologies developed at the NL side of the Chasm.

It is also important to note that the Chasm theory does not mean that findings at the NL side of the Chasm cannot help the study of the objects at the LB side of the Chasm. It does not mean that the findings at the LB side of the Chasm cannot help

the study of the objects at the NL side of the Chasm. For instance, today there is not a single apparatus that is capable of measuring Chi in its totality, but there are many ways to measure the presence of Chi, based on such properties as acoustic [4], [6], [19], imaging [9], [25], chemical [10], mechanical [16], thermal [18], electrical [11], [17], [20]-[24], physiological aspect [12], data analysis [13], and based on functional MRI findings [14]. It is worth noting that over the years, more and more studies validated and verified the existence and the function of the meridians [5], [7], [8], [15], [26].

#### IV. THE MEANING OF THE LAW OF CHASM

In his theory of Special Relativity, Albert Einstein discovered the limit of the speed of light in universe. His theory advanced the development of theoretical physics. Therefore, pointing out a limit can yield positive progress to scientific research. The Chasm Theory predicts that there are limitations of the results that modern medical research can produce. The limitations are beyond the control of such factors as researchers, state-of-the-science, and equipment. They are rooted in the existence of the Chasm. The existence of this Chasm may prevent modern medical research from producing the desired results that are needed to understand the cause of a disease.

For instance, the discovery and the study of *Helicobacter pylori* is a major event in medicine. In 2005, Barry Marshall and Robin Warren were awarded the Nobel Prize in Physiology for their pioneering work on *Helicobacter pylori*. As significant as it is, according to the Chasm Theory, this work on *Helicobacter pylori* may have little to offer in preventing this disease, beyond the development of pharmaceutical drugs. When scientists study the *Helicobacter pylori* bacteria through stomach biopsy, the bacteria are no longer a part of the human body. As far as the Law of Chasm is concerned, the bacteria are at the NL side of the Chasm, thus it will be very difficult, if at all possible, to understand the dynamic interactions between the live host body and the bacteria.

In general, once a sample, such as a tissue and a cell, is taken from a patient, it is no longer a part of the patient's living being. It no longer participates the life process of the patient. This is similar to that of a cut flower in a vase. The flower looks alive, but it is no longer a part of the living plant. Therefore, the cut flower in the vase is a death in slow motion, is not alive as far as the plant is concerned.

Today, studying deoxyribonucleic acid (DNA) is a part of the mainstream medical research. As soon as a cell is taken from the living body in order to extract its DNA, the cell is no longer a part of the living human body. Therefore, studying DNA alone is not likely to understand the interaction between the DNA and its living host, in order to understand the cause and to prevent the disease.

On May 14, 2013, The New York Times published an Opinion page "My Medical Choice" by Angelina Jolie, the world-renowned movie star. In it, Ms. Jolie revealed that based on DNA tests she had tested positive for a gene mutation called BRCA1. This meant that she had a very high risk for

developing breast and ovarian cancer. After counseling with her DNA experts, she decided to have both breasts removed. She shared her reasons to go public in "My Medical Choice" are: "I am writing about it because I hope that other women can benefit from my experience. Cancer is a word that strikes fear into people's hearts producing a deep sense of powerlessness. But today it is possible to find out through a blood test whether you are susceptible to breast and ovarian cancer and take action." [27] This event is perhaps the highest profile success story of genomic research. However, its value for preventing breast cancer and ovarian cancer is limited at best, other than to inspire others to order more gene testing. The logic of removing both breasts in anticipation of the cancer is questionable.

Applying the same logic of remove-to-prevent as that of Ms. Jolie's treatment, if someone ordered a test from this gene testing company, and found out that there is a gene mutation with exceedingly high risk for developing lung cancer, the most dangerous cancer in the United States, this person may face the dilemma of removing perhaps part of the lung as a preventive measure. If this gene mutation shows exceedingly high risk for developing brain cancer, this person may face the dilemma of removing perhaps part of the brain to prevent the cancer. If the gene mutation shows exceedingly high risk for multiple cancers, this person may face the question of removing multiple body parts to prevent the cancers. Of course, in practice, the same logic may not be applicable to these cases, and perhaps few patients would be in favor of doing so. There are good reasons to limit the application of the remove-to-prevent logic only to such body parts as, perhaps, breasts.

The dilemma that this logic can lead to reflects the weakness of this type of DNA research in disease prevention. To prevent a disease, it is important or necessary to understand the cause. This weakness is not due to the lack of talented scientists. It is not due to the lack of accuracy in the data, or the lack of research funding, or the lack of modern DNA research equipment either. It is the result of studying DNA, an object that is no longer a part of the life process of the patient. The cutting edge gene testing may not be able to reveal the cause as many people might expect. Genetic affinity provides a probable cause of a disease, but genes are only a part of the cause of a disease. In addition to genetic characteristics such as gene sequence, there are many other factors that can impact the development of a disease. The analysis of other factors is beyond the subject of this paper.

To be clear, this analysis should not be construed in any way, shape or form as discounting the importance of DNA study, and the importance of any other studies in medical research. DNA is certainly an important and unique identifier of a human being. Therefore it has critical applications in such as areas as modern forensic science. The Law of Chasm helps us to understand the cause of the limitations of current techniques in medical research so that we can improve.

Based on the Law of Chasm, one can reason that placeboes studies on acupuncture may require a redesign. Currently, these studies assume that there is no exchange of Qi between the patient and the doctor. This is not true in clinical practice. For instance, the process of palpation in acupuncture treatments is

an interaction of Qi, even though this interaction is not necessarily visible to naked eyes.

On July 6, 2023, the United States Food and Drug Administration fully approved Leqembi, the first drug shown to slow down Alzheimer's disease [28]. Leqembi comes from the Japanese pharmaceutical company Eisai and its U.S. partner Biogen. The companies have said Leqembi will cost about \$26,500 a year." [29] It is unclear whether this type of drug research on Alzheimer's disease improves the understanding of the cause. Recall that Dr. Alois Alzheimer discovered association between the distinctive beta-amyloid plaques and the disease in the brain histology from the patient Auguste D. Therefore, according to the Law of Chasm, the study on the beta-amyloid plaques is done on non-life objectives, as the brain sample is no longer a part of the live patient. Therefore, it is very difficult, if not impossible, for this type of studies to capture the cause of the disease that developed in live patients.

## V. DISCUSSION

One may argue that Fick's law does not fail in the presence of life. In fact, it is often used to model the diffusion of gases or solutes in biological systems, such as the diffusion of oxygen in lungs or the diffusion of nutrients in the bloodstream.

The reason that Fick's law works in this type of modeling is because the studies are no longer concerned with a living being. A model is an abstraction of the living being, therefore it is non-life. Live biological systems are often more complex than any systems abstracted by models, and the sheer number of variables can be too large to model. There is also the question of whether or not being able to identify the complete set of variables, which is a topic beyond the subject of this paper.

Another argument is that "a living fish uses energy to remove or repel salt from surrounding sea water, so it is not a diffusion process." The fact that this energy cannot be made by means of science and technology developed on the NL side of the Chasm is the evidence that the Chasm exists. In other words, adding together all the ingenuity, innovation, creativity from the dawn of civilization to this day, with all the power including nuclear power, supercomputing power that human beings can possibly have, it is not possible to make this energy from NL side of the Chasm, to enable this fish to repel salt from the surrounding high salinity water. Only a live fish possesses this energy.

## VI. CONCLUSION

There is a conceptual chasm between living beings and non-life objects, therefore the scientific laws and findings obtained by studying the objects on the non-life (NL) side of the chasm may not all hold true at the living beings (LB) side of the chasm, and vice versa.

TCM provides a path forward to study diseases in LB sided of the chasm, due to its innate approach of examining live human beings.

## VII. FURTHER RESEARCH

Further research is required to understand this phenomenon and its ramification in medical study and clinical services. For

instance, one research direction can be whether there is a "bridge" that goes across the Chasm. If the answer is yes, then further research is needed to find out where this "bridge" is or how this "bridge" can be constructed. Another area of research is to explore the possibility of bridging this Chasm by leveraging the advancement of science and technology, such as artificial intelligence, quantum physics, and nano-technology.

In August 2023, researchers at the University of Ottawa and researchers from the Sapienza University of Rome published an intriguing image of entangled photons by using their newly developed technique to visualize the wave function of two entangled photons in real time. What is intriguing is that this image of quantum entanglement looks like a yin-yang-like image.

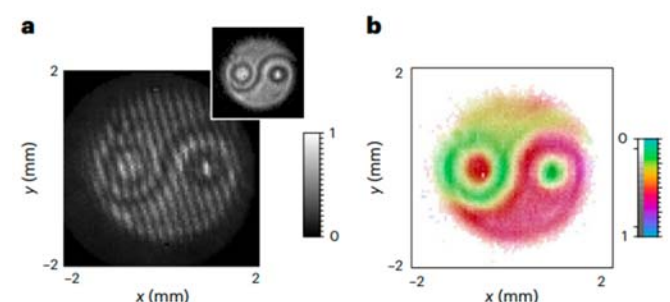


Fig. 2 The shape of a Ying and Yang symbol [30]

Yin-Yang-like image, also known as Tai Ji image is well known in TCM to illustrate the dynamic relationship between Yin and Yang. The theory of Yin-Yang is a foundation in TCM. It is rooted in the philosophical foundation of Daoism (aka Taoism). The earliest drawing of the Yin-Yang-like image can be found in books about 1100 years ago. This quantum entanglement research result could be pointing to a possible path connecting two sides of the Chasm at quantum level.

The above questions are only a start for an exciting area of scientific research for years to come.

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