When the West meets the East:

Traditional Chinese Medicine from the perspective of Western Medicine

A literature review and personal observational pilot study by

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Student Thesis

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Abstract

Background:
As Complementary and Alternative Medicine(CAM) is gaining more popularity in our world, their usage and effectiveness is also vigorously debated. There are different opinions among doctors and patients. Traditonal Chinese Medicine(TCM) is considered to be the most widely accepted form of CAM in Western Medicine(WM), especially acupuncture.
I have a Chinese background as both of my parents are Chinese. As a medical student at the University of Oslo, I am open-minded but also critical to TCM from the perspective of WM. The aim of this compulsory student thesis in the Oslo medical curriculum thus was to learn more about TCM, partly from a WM perspective.

Methods:
Through a litterature review, I collected relevant litterature about TCM, including historic background, development, education, herbal medicine and acupuncture. In addition I tried to put TCM into a WM perspective and compare strengths and weaknesses in both, setting TCM and its application in relation especially to cancer and chronic diseases. I additionally included field work in China, to get hands on experience on how TCM is used in a hospital in to-days China.

Results:
The thesis is written as two parts. The first part is the literature review, where I have tried to systematize the available data about TCM, including historic background and development of various trends in TCM. I go into detail on herbal medicine, acupuncture and its application in cancer and chronic diseases. I also give an overview with relation to education in TCM.
The second part is a pilot observational study, based on my own observations and experience during my stay at a TCM hospital in Beijing China the summer of 2009.

Conclusion:
TCM has its unique way of thinking. Many of the ideas seem obscure at first glance. After some thought, however, they clearly make sense. A lot of studies were carried out in order to address the efficiency of TCM therapy. Some of them favor TCM and advocate further investigation. Unfortunately many of them are also inconclusive due to methological weakness.

Today TCM in China is partly integrating with WM and many approaches resemble WM. The result is clear and bears fruit for the Chinese people. Unique approach like tongue, pulse diagnostic, herbal medicine and acupuncture is the cornerstone of TCM diagnostic and treatment and is fascinating. However to some extent they seem mysterious and lack a scientific basis. All in all I think we could clearly learn something from TCM and we should carry out more study in order explore and further address their usage in different diseases. I think the holistic approach will be beneficial for both patients and WM doctors, especially when it comes to chronic diseases.

Abbreviations

TCM	=	Traditional Chinese medicine
WM	=	Western Medicine
GP	=	General practice
CAM	=	Complementary and Alternative Medicine
NO	=	Nitrogen Oxide
iNOS	=	Inducible Nitric oxide syntheses
ACE	=	Angiotensin Converting Enzyme
AAA	=	Abdominal Aorta Aneurysm
RCT	=	Randomized Clinical Trials
GAP	=	Good Agriculture Practice
GMP	=	Good Manufacture Practice
IM	=	Intramuscular

Methods

For the literature review, it was of crucial importance to find relevant publication. To do that, I searched the databases PUBMED, Cochrane, Ovid Medline and CINAHL. The initial search words were: Traditional Chinese Medicine(TCM) OR herbal medicine, Traditional Chinese medicine AND (cancer or malignancy) and Acupuncture. I later added key words like holism, holism AND TCM, holism AND Western Medicine(WM), reductionism, reductionism AND WM.

There are many articles published on TCM. Compared to the vast number of articles about WM there are, however, still few publication about TCM, and even less than that was relevant for this literature review.

The articles are either written by WM doctors in English or by TCM doctors in Chinese, the latter often with an English abstract. My review is mostly based on articles written by WM doctors. I had trouble in understanding the Chinese articles. This was partly because of my insufficient knowledge of Chinese language, but mostly because many TCM terms were difficult to understand or might have ambiguous meanings.

The articles written by WM doctors provided much information about the effect of different TCM interventions, but none is about the fundament of TCM thinking. Articles were thus not enough. Since understanding the fundament of TCM was crucial to me, I searched for textbooks about TCM. I found two well written and comprehensive books about TCM, both written by Giovanni Macicia, one of the most highly respected practitioners of TCM: “The Foundations of Chinese Medicine” and “The Practice of Chinese Medicine”.

There are some bias related to the information I found in my literature search. WM doctors might be too critical against TCM as TCM has a fundamentally different way of thinking and might seem obscure at first glance. On the other hand TCM doctors might be too enthusiastic as they eagerly want TCM to be acknowledged. An even more critical bias by excluding articles written in Chinese is that I lost access to the newest update on TCM research.

For the observational study, I stayed at Xiyuan hospital for about one month in summer 2009. I observed wards round, different clinics and different therapy departments.

A brief history and background(1)

TCM is a healing system that was developed in China about 3000 years ago. Compared to many other alternative or complementary medicines TCM has many unique features. Firstly, even TCM has abstract ideas like ying, yang and the five elements, it is a complete and rational system consisting of diagnosis, treatment, prognosis and prevention. It seeks to treat all kind of illness people could encounter. Secondly, even though most of the knowledge was transferred verbally at the beginning of TCM history, the knowledge has systematically been handed down since the first textbook (*The Yellow Emperor's Internal Medicine)* dated back to 800 BC – 200 BC, a textbook that is still in use. Lastly, TCM has been continuously developing since its dawn. It is still an important health system for the Chinese people of today.

At 2200 BC early Chinese inhabitants empirically found different ways of healing. For instance, while using hot stones to warm themselves, inhabitants realized that pressing them against certain parts of the body could give relief for certain sicknesses. They also found that pricking themselves with bone needles in particular spots could relieve pain in other areas of the body. This is the acupuncture at its very beginning. At this stage, however, the medicine was much intermixed with magic and other rituals.

The classic books of The Yellow Emperor (*The Yellow Emperor's Internal Medicine)* and Fire Emperor *(Classic of Herbal Medicine)* lay the fundament for the theory and philosophy of TCM as well as principles of herbal and acupuncture treatment. The books have a huge impact on later TCM development. Both books are dated to 2nd and 1st century BC. Although the books are attributed to the Yellow Emperor and the Fire Emperor, they were in fact written by several authors over a long period of time. In ancient time it was common for the Chinese authors to assign authorship of books to the great teachers or important persons who influenced them.

At Han-dynasty 200 BC – 200 AD, Zhang ZhongJing wrote a book called *Shanghan Zabinglun (Discourse on Fevers and Miscellaneous Illnesses)*, about the treatment of febrile conditions. At this stage there was no distinction between febrile illness caused by infection or non-infection. However, it is still significant as it discusses diagnosis and treatment methods based on an assessment of the symptoms of different pathological conditions.

Hua Tuo(145 - 208AD) is famous for his skill as a surgeon and his use of anesthesia. The anesthesia was called mafeisan and was taken by the patient before surgery. *Mafeisan* combines *ma* (麻 : ”cannabis, hemp, numbed or tingling"), *fei* (沸 : "boiling or bubbling"), and *san* (散 : "to break up or scatter", or "medicine in powder form"). Therefore, the word *mafeisan* probably means something like "cannabis boil powder". Unfortunately, many of Hua Tuo's works have been lost. Additionally, surgery became unpopular because religious and cultural belief. To some extent surgery in TCM died with Hua Tuo. Besides performing surgeries, Hua Tuo also recommended physical exercises to his patients. He devised movements that were similar to the movements of five different animals: tiger, deer, bear, monkey and bird.

From 200 AD – 580 AD the concept of blood and circulation was fully developed in the practice of TCM. Two separate systems of circulation within the body was defined, each with a specific substance flowing through it. Blood goes from the heart and into vessels throughout the body. Qi was thought to be an abstract form of energy that circulated throughout the body in invisible tracts called meridians or channels. Wang Shuhe (265–317 AD) wrote the *Maijing (Pulse Classic or Manual on the Pulses),* which was a summary of the available knowledge on pulse diagnosis up to this point in history. In TCM diagnostics, examination of the pulse is central as different pulse is thought to indicates different diseases. All together 24 different kinds of pulses were identified in this book.

Lei Xiao's *Liu Juanzi Guifang* around 500 AD provides information of the treatment of wounds caused by metal instruments and disease affecting the skin such as anthrax and abscesses. Mercury is also mentioned for curing some skin conditions.

In the Tang Dynasty 618-907 AD, due to China's expansion and improvement in communication and transportation systems, medical knowledge was exchanged between different countries.TCM concepts was brought to foreign cultures. In return, these foreign cultures added new ideas to TCM. TCM doctors travelled to countries which is today's Korea, Japan, India and Vietnam. Many of the previously mentioned Chinese medical texts were translated into these countries' languages. From Korea, herbs such as ginseng, giant Typhomium tuber (*bai fuzi*), Korean pine and others were introduced to China. From Vietnam came vanilla grass, sappan wood, and cloves. Ophthalmology was quite undiscovered in TCM before Tang dynasty. It was developed by Buddhist monks who were popular both in China and India. Herbs such as ephedra, ginseng, and angelica were also brought from China to India.

In the Jin-Yuan period 1115 - 1368 AD, several schools of thought evolved, each with their own concept of factors that contribute disease and with contrasting approaches to treatment. Mongolian physicians additionally have their own set of thoughts that was distinctly different.

Liu Wansu (1120-1200) emphasized the importance on the elements of fire and heat. He frequently prescribed herbs with cold properties to treat disease arising from these influences. His school is later called "School of cooling". Herbs that were frequently used are cassia twig, rehmannia root, ephedra and mint.

Zhang Congzheng (1150-1228) had an innovative approach to medical treatment and advocated that the treatment should follow the progress of the illness: "the medicines of yesterday could not use to treat present-day illnesses". He is best known for his theory of the "six doors and three methods." The six doors refer to the six influences (wind, summer heat, dampness, fire, dryness and cold) that Liu Wansu observed and thought was the etiology of different illness. The three methods are the therapeutic regimens Zhang used to induce sweating, vomiting and purging for cure.

Li Gao (1180-1251) is famous for his work about how social factor could affect the body's functions. He believed that a person's emotions, including anger, joy, sadness and grief, could influence the qi, and that illness was caused by a society plagued by poverty, war and oppression. He might be classified as the first doctor in community medicine in TCM history.

Nomadic Mongols were known to be furious warrior and was constantly involved military activity. This stimulated the development of external medicine. Wei Yilin (1277-1347) wrote *Shiyi Dexiaofang (Efficacious Remedies of the Physicians)*, a textbook about treatment of fractures and dislocations of shoulder, hips and knee. It was the start of orthopedics in TCM.

Around the time of Ming dynasty (1368-1644 AD), Wu Youxing (1580-1660) discovered that some diseases were caused by a transmissible type of Qi, which called liqi (pestilential Qi). *Liqi* had the following characteristics:

1. It could be cured by herbs.
2. The site of entrance to the body was the mouth and nose.
3. The severity of the disease depended on the amount and intensity of the excessive influence, and the body resistance.
4. Each pestilence was associated with its own particular liqi.

Wu's thinking has some resemblance to microbiology and is the first in TCM history to propose germs as a cause of epidemic diseases.

In *The Genuine Surgery,* published in 1617, Chen Shigong (1555-1636) describes a series of diseases that were surgically treatable at that time in addition to effective and useful prescriptions that could be helpful after the operations. The book outlines the surgical procedure for amputations, removal of nasal polyps, foreign body from the respiratory tract, hemorrhoids and cancer of the lip and breast.

Li Shizhen (1518-93) is considered to be one of the greatest contributor to TCM herbal medicine. He revised the classification of drugs, expanded the list of known drugs, corrected previous errors, and created guidelines for the collection, preparation and the use of drugs. His work is published in *Compendium of Materia Medica* in 52 volumes, detailing a total of 1,892 drugs with 1,160 illustrations and almost 11, 096 prescriptions. This was a multidisciplinary book of botany, pharmacology and therapeutics and is still a highly authoritative reference in TCM.

In Qing Dynasty 1644 - 1911AD the knowledge of anatomy was further developed. Wang Qingren (1768-1831) published his *Yilin Gaicuo (Errors Corrected from the Forest of Physicians)* in 1830. His observation included different organs and structures in the body which were unknown to TCM up to that time, including the abdominal aorta, pancreas and the diaphragm. He also demystified several mistaken beliefs. The most famous one is that he made it clear that the brain was the center of thought and memory, not the heart.

Preventive measures for variola (smallpox) had been used in China as early as the sixteenth century. A method of inoculation was used. Dry crusts and scales from a patient with smallpox where reduced to fine powder that the healthy individuals were made to inhale through the nose using a silver tube. Even though the method was far from perfect, it seems to have played some role in the prevention of smallpox and could, in some ways, been regarded as vaccination in its earliest form.

Western Medicine and Traditional Chinese Medicine: A comparison

To some extent TCM history resemble WM history until 18th century. From the dawn of WM, there are many similar ideas like the four humors by Hippocrates (blood; phlegm; choler, or yellow bile; and melancholy, or black bile). Throughout time both TCM and WM moved away from the belief that disease was caused by supernatural forces but rather related to environmental factors, diet, and living habits. Before the introduction of aseptic technique, bleeding control and anesthesia, TCM and WM were both mostly related to what we today could define as internal medicine. Only minor surgery was carried out. TCM and WM mostly had an empirical basis and was a model for seeking to understand the nature. Until 18th century TCM could be regarded as the most advanced health system as it was more systematically developed and organized than WM at that time.

There are some fundamental incompatibilities between TCM and WM. One major difference is that TCM has little anatomical and pathological knowledge, acquired in WM from cadaver dissection. The viscera and bowels in TCM theory is fundamentally different to those defined by WM. The “triple warmer (or burner)” for example has no anatomical equivalent in human body and is concept rather real organ.

The rise of scientific WM in the 19th century and later has outdated some TCM principles(2). The introduction of microscope gained the detailed information about the cell.s and the organ’s microscopic structures. Rudolf Virchow introduced the concept of the cell as the centre of all pathological changes through his *Die Cellularpathologie*, published in 1858. This outdated the view that disease is due to an imbalance of the four humors. From then on WM link the patient’s illness to cellular pathologic process and the linked change in the chemistry and physiology of the body.

In 19th century the fact that diseases could be directly caused by living organisms was made conclusive. This concept completely revolutionized the practice of surgery. Joseph Lister’s introduction of phenol during surgery to prevent infections, the sterilization of equipment using Robert Kock’s steaming methods, rigorous hand washing and later implementation of rubber gloves all quickly reduced the infection rate. *Antiseptic Principle of the Practice of Surgery* by Lister was groundbreaking and laid the foundations for further development in infection control and the modern aseptic operating theatres within 50 years.

The introduction of ether as a general anesthesia on October 1846 freed the patient from the fearful pain of surgery but also gave the surgeon the opportunity to perform more extensive operations. From then on surgery became an acknowledged speciality and made a huge advancement. Through careful and methodological scientific work, WM continued to make huge advances.

TCM somehow became stagnant and seem to be lacking behind, still talking about abstract ideas like Yin, yang and the five elements, lacking scientific proofs. Today’s WM is without doubt the most exact and scientific health system ever developed.

Despite this, WM has its flaws. Since Descartes and the Renaissance, science, including medicine, has taken a distinct path in an analytical evaluation of the natural world(3). This approach has been described as “divide and conquer”. The idea is that a complex problems could be solved by dividing them into smaller, simpler and thus more understandable units. In modern WM the diseases are defined through the cellular morphological, biochemical, molecular, biological, genetic and signalling pathway changes.

Because the problems are “reduced” into more basic units, this approach has been termed “reductionism”. This has been the predominant paradigm of science over past two centuries, and to a large extent a prominent feature in WM.

PW Anderson (4), however, in a Science article in 1972 claimed that the behaviour of large and complex system cannot be understood by simple explanation of its constituents. “Instead”, he stated “at each level of complexity entirely new properties appear”.

In applied science, different science system can be used to explain each other. Like chemistry applies to molecular biology, molecular biology applies to cell biology. But this does not imply that molecular biology is just applied chemistry etc. The analog in medicine is that even if we understand the function and working mechanism of every small pieces of human body, it does not mean that we do fully understand the human body as a whole. What we understand is simply those small pieces.

Focus on a singular factor(5): Much like a mechanic who repairs a broken car by locating the defective part, WM typically treats disease by identifying the isolatable abnormality which is most responsible for the illness. The deeply rooted belief is that each disease has a potential singular target that could be the aim for the medical treatment. For infection, the target is the microorganism; for cancer, it is the neoplastic cells; and for bleeding, it is the bleeding vessel or ulcer.

The success of this approach is without doubt. However it leaves little room for contextual information. Many studies have shown that some of the most intuitive intervention might not be as beneficial to the patients as we like to think, some of them even harmful. For example, in type 1 diabetes the single most important pathology is insulin deficiency. The most intuitive intervention would aim to correct the glucose level to the normal and then the patient’s health problems should disappear. However, in a recent study (6) the strategy of more intensive glucose control resulted in increased risk of death and did not significantly reduce major cardiovascular events. Likewise, in cancer therapy intensive chemotherapy can reduces tumor size initially but also produces other complications, including the promotion of secondary tumors (7,8). Therefore correcting a singular factor without considering the whole may not be beneficial.

Emphasis on homeostasis(5): For decades, homeostasis has been a vital, guiding principle for medicine. Already early in 19th century we knew the body’s remarkable ability to maintain stability and constancy in the face of stress. Illness is thought to be a failed homeostatic mechanism, and treatment aims to substitute for this failed mechanism by correcting deviations and makes it within normal range. This corrective approach is beneficial for some disease, like hypothyroidism, hypokalemia

and diabetes. However this interpretation of homeostasis is biased. Because reductionism often disregards the dynamic interactions between parts, the system is often depicted as a collection of static components. Therefore emphasis is placed on static stability/normal ranges and not on dynamic stable states, such as oscillatory or chaotic behavior (seemingly random but deterministic). Failure to include these dynamic states in the homeostasis model may lead to treatments that are either ineffective or even detrimental.

Additive treatments(5): In reductionism, multiple problems in a system are typically handled separately. Each problem is divided and addressed individually. In cardiovascular disease, for example, the known risk factor is addressed individually: hyperlipidemia is given statin or hypertension is given antihypertensive. The strategy is also applied to coexisting diseases like hypothyroidism, diabetes, and coronary artery disease, which older patient is struggle with. Each disease is treated individually, as if the treatment of one disorder has no effects on the treatment of another. It neglects the complex interplay between different diseases and treatments. The assumption is that the results of treatments are additive rather than nonlinear (5).

A large part of research in WM is population based(9). When we want to decide which drug is the drug of the choice, we do different randomized clinical trials (RCT) where we compare which drug is most beneficial for the whole group. The assumption is that the drug which gives the whole population the healthiest benefit is the best one. But in a heterogeneous population, patients may display a variety of genetic variations or other constitutional factors that respond differently to a given medical intervention. The same treatment could be of benefit to some patients yet harmful to others. To measure the risk and benefit using a large heterogeneous population will likely produce conflicting data. Effective treatment which have great effect on some but not everyone will be discarded. The same might be true for treatment which is bad for some but good for most people(10).

In contrast to the reductionism of WM, TCM tends to think holistic(11). The idea of holism is that all the properties of a given system cannot be explained by its components parts along. When different constitutes of a given system work with each other, the whole system is simply more than what appeal to be the sum of the constituents. This was also stated by Aristotles in the Metaphysics: "The whole is more than the sum of its parts". The concept of holism in TCM views the various parts of the human body as a whole organ, emphasizes the harmony and coordination of the internal organs among each other, other parts or structures and the unity of the human body with the external environment. Besides TCM emphasize the importance of body, mind and spirit.

The idea is that the health of an individual is subject to constant battling between opposing forces, like warm and cold, happiness and sadness, yin and yang. An imbalance between different factors causes different kind of diseases. The aim of TCM is to restore the imbalance. When the body is out of balance, TCM not only focus the organ that causes the symptoms but also treat the whole system which is affected by the illness. Only then an individual can fully recover. Hence there is *no* singular factor in TCM but individual as a whole. According to TCM a patient's illness is constantly changing, hence a single diagnosis by TCM standard can't be sufficient. That's why TCM never gives a patient the same kind of treatment during the course

of an illness but constantly changes the treatment according to the development of the patient's illness. Hence in TCM there is not only homeostasis but also homedynamics.

Similar to WM, it is crucial to have a classification of illnesses. Much like WM, in TCM inspection, listening, smelling, radial pulse palpation and inquiry make the basis. The end point is, however, totally different. In WM we have a clearly defined diagnostic system which is constant and often is a result of one crucial pathogenic factor. For example, when a patient has pneumonia, it is caused by harmful microorganisms and he will be treated accordingly and his diagnose will not be changed if he get better the day after commencement of intravenous antibiotic treatment. (Unless the diagnosis was wrong in the first place).

In TCM there are also clearly define equivalent(12). Zheng can be translated as a syndrome or a pattern of disease. According to the TCM way of thinking, they are the result of both the pathogenic factor and maladjustment in the patient, and is thus constantly changing during the course of the illness. The TCM doctors claim that the number of potential different stimulants is enormous while the body's number of reaction types is limited. For instance: different microorganism that cause infection can all lead to fever and cancer in different organs and sites of body can often lead to fatigue and nausea. In TCM, the visible signs and symptoms of patients are analyzed to identify the pattern or syndrome. A 'pattern or syndrome' is defined as a specific functional state which is the sum of both the pathogenic factor and the body's response. The treatment is thus designed to improve the body's regulatory mechanisms and remove factors that impair the self-healing ability of the body.
In TCM, apparently distinct diseases (according to WM diagnostics) can share a common syndrome/pattern with other distinct diseases and be treated with the same set of herbs as the focus is to give a response to the body's self-regulation. The concept is one treatment regimens for multiple syndromes/patterns(12). Different diseases with similar underlying mechanisms have also been found in WM. For example, insulin resistance is shared by several disorders, including hypertension, diabetes, obesity, hyperlipidemia and atherosclerosis.

Although different diseases have common pathological mechanisms, the response of one disease might not be identical in different people and therefore a different therapy is needed. The concept is multiple treatmentregimens for one syndrome/pattern(12). This individualized therapy concept in TCM originated from the ancient physicians' concern with constitutional differences and different reactions to one pathogen factor among individuals. Even when treating the same pathological change (e.g. myocardial ischemia), TCM practitioners still give individualized therapy based on the symptoms and the patient's constitution

The TCM pattern or syndrome concept is not explained by the conventional way of thinking based on anatomical and physiological explanations but on instead in philosophical thinking path of yin and yang, qi and the five elements. It is here WM collides with TCM. While WM elaborates huge effort to draw connection between the pathology and the actual anatomical and physiological changes, TCM merely relies on the philosophical thinking and empirical knowledge. It has historical origin as there were no modern tools like microscope in ancient China and cultural origin as TCM had borrowed many ideas from Taoism which has always focused more on the

function rather structure. While the WM focuses on the structure (cell, tissue or entire organ), TCM focus more on the function, which is observable and accessible. The knowledge about different state of function was then accumulated through time and explored.

However it should be stressed that not every aspect of TCM can be seen as holistic, nor should it be assumed that all elements of WM are merely reductionist and non-holistic(13). Hippocrates highlighted already 2000 years ago the significance of environmental, emotional and nutritional cause of disease. The concept of holistic health care has always been fundamental to good medical care. The current curriculum in medicine at the faculty of Medicine at the University of Oslo, is, for example, based on a biopsychosocial concept of health and disease, with focus on the interactions between these concepts in the individual but also in a society on the whole. WM has also started multidisciplinary centers where different health professionals sit and discuss each patient together in order to have a holistic plan for patient care. In TCM the doctors who treat orthopedic problem, especially fracture is exactly the same in WM and rely on anatomical knowledge. Ideas from the different perspectives seem to merge.

Today TCM faces the challenge to prove it efficiency. TCM is difficult to evaluate due to its unique principles and therapeutic objective(14,15). When designing a RCT for acupuncture for example, the investigator is faced with choices concerning the selection of points, the depth of needle insertion, and the frequency and scheduling of treatment. Besides TCM advocates individualized therapy ("Multiple treatment regimens for one disease") for the patients with the same disease, which further complicates the research process. Some suggestion is that the patients could be divided into two groups with one receiving placebo and the other one receiving TCM. The patient group receiving TCM can receive individualized treatment. By this way TCM effectiveness can be tested and compared to placebo. The downside is what we don't know what is the specific therapy which helped the patients and hence not able to identify the underlying mechanism of the specific therapy. Therefore much efforts remain to be done in order to further address the efficiency of TCM.

TCM herbal medicine

Herbal treatment is fundament for TCM treatment. Classics like *Shennong Bencaojing (Classic of Herbal Medicine)* and Materia Medica (Ben Cao Gang Mu) are the basis of TCM herbal formula. The classics contain information about herbs' nature, location, and time of harvesting. In general a TCM prescription usually consists of a mixture of 2 to 40 herbs, each in different quantities. In a prescription herbs are classified into 4 different categories(16):

1. The “emperor” herb, the major herb that contains the bioactive components for the pathophysiological or disease condition
2. The “minister” herb, provides support for the action of the major herb or alleviates secondary symptoms of the disease
3. The “assistant” herb, serves to modulate the action of the emperor herb, enhance the action, counteract adverse effects of the herbal mixture
4. The “messenger” herb, directs the action of the other herbs to specific organ or parts of the body.

Unlike WM, the balance and interaction of all the ingredients are considered more important than the effect of individual ingredients. TCM focuses on the whole. While WM prescribes medicine with one or two active ingredients, a TCM prescription would contain up to 40 herbs each with its unique chemical composition. TCM is based on the thought that every medicinal substance has its strengths and shortcomings, and that each ingredient in the formula should be carefully balanced in quality and quantity, in order to increase its efficacy and at the same time reduce the adverse effects(17). How to make different herbs to cooperate each other synergistically is what makes the difference between a good Chinese herbal doctor and an amateur. A key to success in TCM is the treatment of each patient as an individual.

TCM herbal medicine includes ingredients from all parts of plants, such as the leaf, stem, flower, and root. It also incorporates the ingredients from animals. Some of the animal is endangered, such as seahorses, rhinoceros horns, and tiger bones. It has created a lot of controversy and there is still black markets of poachers who hunt restricted animals.

There are several ways to prepare herbal medicine. The most common includes infusions, decoctions, tinctures, and macerations.

1. Infusion is much like making a cup of tea. Water is brought just to a boil and then poured over an herb (or combination of herbs) and kept covered for 10-15 minutes.
2. In decoction the herbs is boiled for a longer period of time.
3. A tincture is an alcohol and water extract which is used when plants have active chemicals that are not very soluble in water, and/or when a larger quantity is prepared for convenience and wanted for longer term storage. Many properly prepared plant tinctures can last for years without losing potency. It is a common belief that as a tincture gets older it becomes more potent as well.
4. Maceration is simply covered in cool water and soaked overnight. The herb is strained out and the liquid is taken. Normally this is used for very tender plants and/or fresh plants, or those with delicate chemicals that might be harmed by heating or which might be degraded in strong alcohol.

TCM herbs are also prepared as pills, tablets, capsules and plaster, usually for pain relief. Several herbs and other ingredients are dried and then formed into pills. They are characteristically little round black pills., They are mistakenly called Chinese patent medicine, but are not "patented" in the traditional sense of the word Instead, "patent" refers to the standardization of the formula. All Chinese patent medicines with the same name will have the same proportions of ingredients. Nobody has exclusive rights to the formula. Chinese patent medicines are easy and convenient. They are not easy to individualize on a patient-by-patient basis, which is the core and fundament of TCM. However, those preparations are the best used when a patient's condition is not severe and the medicine can be taken as a long-term treatment(18).

There is, however, one big challenge facing herbal medicine is its consistency. TCM herbs are complex. Different species, cultivation areas and time of harvest all lead to variation in the raw herb quality. In one TCM herb there could be more than one active component and TCM prescription usually consist of 2 to 40 herbs. This complicates the picture as the variation in raw herbs leads to variation in product composition and bioactive components. Consequently,varied concentration of bioactive components can lead to overdose or underdose of a patient. The chemical composition of a herb can also be

altered by the preparation method. According to this, severe adverse effect has been reported(19). Despite its complex nature, TCM has attracted many big pharmaceutical companies who are using TCMs as an excellent pool for discovering natural bioactive compounds. However, the characteristics of TCMs are their multi-target and multi-channel due to their complex chemical constituents that are reinforcing, mutual assist and mutual detoxify each other. If only few constituents are emphasized, the holistic nature of TCM will be neglected.

Identification of bioactive components has therefore become a critical issue for research and development of new herbal product. Several scientific methods have been developed to identify the herbs(20-22). There are conventional separating methods like chromatographic methods, electrophoretic methods and spectroscopic methods. The fingerprinting methods are becoming increasingly popular in recent years. It does not promote the use of particular techniques but encompasses a unique style of data evaluation. Conventional methods usually enable the quantitative determination of individual compounds that are either unique for a herb or responsible for biological activity. But they fail to provide a complete picture of a herb composed of a multitude of constituents, whether they are active or not, specific or common. Fingerprinting combines the usage of chromatographic, electrophoretic, and spectroscopic method and establishes a pattern of a herb based on its similarity and integrity. The analysis and quality control of TCMs are thus moving in an integrative and comprehensive direction, in order to better address the inherent holistic nature of TCMs.

Does herb medicine work?

The fact that one herb can be used to treat several different diseases, but several herbs may be needed to treat one disease makes the whole picture complex. Many studies have been done to identify the working mechanism of herbal medicine. I will give a few recently studied herbs as examples.

Danshen(23), Radix Salvia miltiorrhizae Bunge, a dried root grown mainly in China, is widely used in China in the treatment of cardiovascular disease and has been shown to lower blood pressure in human. In rat studies danshen has a negative inotropic effect and increases coronary blood flow. Furthermore, danshen treated patients had better post-ischemic reperfusion recovery of ventricular-developed pressure and less contracture than untreated patients. The vasodilatory action is identified to be the action of tanshinone Ⅱ-A, which works as calcium-antagonist. Besides tanshinone Ⅱ-A can inhibit the production of NO, interleukin-1β, interleukin 6, TNF-α and very interesting down regulate the expression of NO syntheses (iNOS). Another bioactive component is Magnesium tanshinoate B (MTB). It has an anti-hypertensive effect by blocking ACE.

Taxus chinensis(23), According to TCM it removes toxin from body and relieve cough. Taxol is characterized as a complex polyoxygenated diterpene and has an unique anti-cancer effect. The cytotoxic properties of taxol were due to its ability to induce the assembly of tubulin into microtubules and to stabilize microtubules to an extent that mitosis was disrupted. Taxol was approved as anticancer drug by U.S Food and drug administration in 1992. Its derivative, **Paclitaxel,** is a drug of choice in the treatment of advanced ovarian cancer, second-line treatment of AIDS-related Kaposi's sarcoma, in combination with cisplatin for treatment of non small-cell lung cancer and approved drug in treatment of breast cancer.

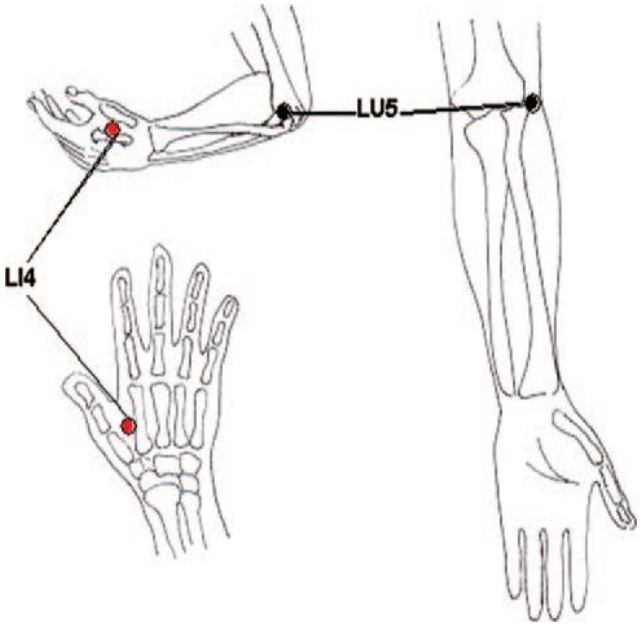
Artemisia(23), has been used in TCM to reduce fever for more than 2000 years. The last two decades, the herb has been found effective in the treatment of malaria. Artemisinin, which is the bioactive component of Artemisia has a peroxide group in its chemical structure. The 2 oxygen molecules of the endoperoxide bridge break apart in the presence of iron and thus acts like a smart bomb when it encounters malaria parasite-infected blood cells. The effective treatment of malaria by artemisinin has been hailed as a model for the effective development of modern TCM.

TCM acupuncture

Acupuncture is another cornerstone in TCM. The word acupuncture derives from Latin, acus means needle while pungere means to stick/punctate. In Chinese acupuncture is called Zhen Jiu. Zhen is needle while Jiu means warming, both techniques common in acupuncture.

Acupuncture has been the subjects for WM research for a long time with some proven effect. Therefore acupuncture is considered to be the most accepted therapy among the numerous complementary and alternative medicine (CAM) therapies.

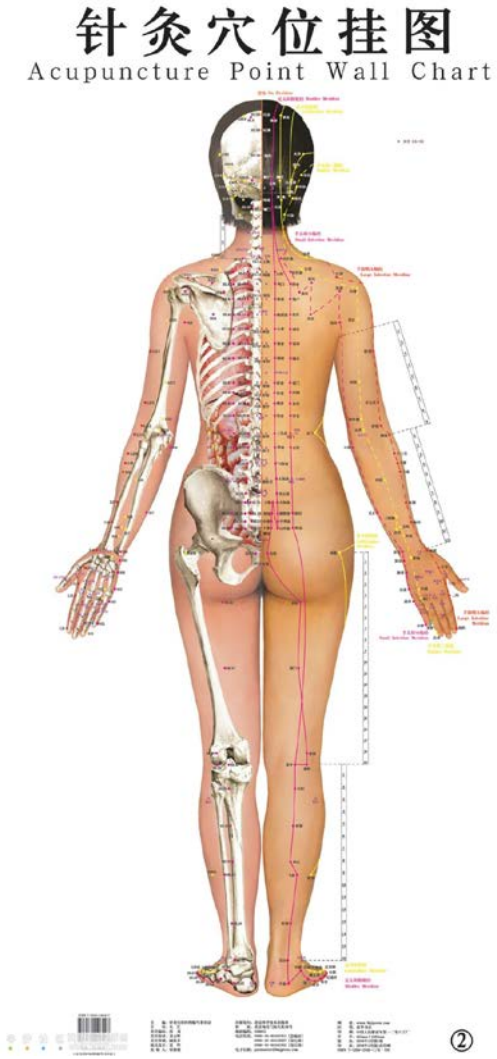
The first study that examined the scientific basis of acupuncture analgesia was published in 1973(24). A group of investigators used a model of acute pain mediated by potassium iontophoresis with gradual increases of electrical current. The volunteers were randomized to receive acupuncture at large intestine 4(LI4) and stomach 36 (ST36) or intramuscular(IM) morphine. The result showed that both acupuncture and morphine increased the subjects' pain threshold by an average of 80%–90%. However the increased pain threshold induced by acupuncture was gradual, with a peak effect at 20 – 40 min, and then followed by an exponential decay with a half-life of approximately 16 min, despite continued acupuncture stimulation. Interestingly when the researchers injected local anesthetic into these acupuncture points before the stimulation, the acupuncture became ineffective in increasing the pain threshold. This suggested that an intact sensory nervous system is necessary for the transmission of acupuncture signals. The study also showed that the analgesic effect was the same independent of which side of the body was stimulated and a greater cumulative effect was observed when multiple acupuncture points were stimulated simultaneously.



Intensive research is done to reveal the working mechanism of acupuncture. One of the most well documented effect of acupuncture is the analgesic function mediated by endogenous opioid peptides and various neurotransmitters in the central nervous system.

Acupuncture is believed to have some local effect as well. It has successfully been used in the treatment of lower back pain. The treatment then consists some special acupuncture points plus an *ah shi* point. Ah shi point is a functional point located at the site where the pain is felt. It may be analogous to trigger point in Western Medicine. The location of the consensus acupoints for sciatica corresponds for example to that of the sciatic nerve. The consensus acupoints for trigeminal neuralgia

are located in proximity to the branches of the three divisions of the trigeminal nerve (ophthalmic nerve, maxillary nerve, mandibular nerve). Similarly, the consensus acupoints for facial nerve palsy correspond to the location of the facial nerve and affected muscle. It is tempting to draw a link that acupuncture, if it works, executes its effect by stimulates the affected nerves locally (25). Recent studies (26,27) show that the acupuncture needle stimulates the nerve fibers in the muscle and trigger the release of vasoactive substances locally, thereby improving the local blood flow and hence promote healing. In a retrospective case series of subcutaneous electrical stimulation of branches of trigeminal nerve for treating trigeminal neuralgia, Johnson and Birchiel (28) concluded that it is effective and that a clinical trial is warranted.



In segmental analgesia, the acupuncture needle activates some afferent nerve fibers to the dorsal horn of the spinal cord. This inhibits the nociceptive pathway at the same spinal level and gives an analgesic effect at the same dermatome level (25).

The Cochrane library includes many reviews about acupuncture treatment for different diseases, ranging from somatic disorder like lower-back pain (29), chronic asthma (30), rheumatoid artritis (31), migraine prophylaxis (32), vascular dementia (33), epilepsy (34), chemotherapy induced nausea and vomiting (35), to psychological disorder like depression (36) and schizophrenia (37). There are even acupuncture procedures for smoking cessation (38) and insomnia (38,39). Most of the results of these reviews are, however, either inconclusive or with poor evidence due to the lack of quality and quantity of the studies.

TCM and chronic disease

Many TCM doctors and many patients who have received TCM treatment claim that TCM is especially helpful against chronic disease. Chinese people have the opportunity to choose both TCM and WM when facing diseases. During years of experience, Chinese people have drawn some conclusions about when they should seek TCM or WM.

A lot of the patients share the common belief that TCM is good for some milder illnesses and chronic diseases, for example, coughs, colds and musculoskeletal disease. It is known to clearing the “root” of the disease when WM fails. Furthermore many people use TCM as a supplement in order to get the rid of the adverse effect of WM medication(40).

Chinese people also consider TCM to be quite slow in its action. It takes longe time to prepare TCM herbal medicine and most of them taste bitter and unpleasant. TCM doctors often ask the patient not to eat some types of food during the course of the treatment because sometimes the food could aggravate the illness. In addition, according to TCM philosophy, an illness is constantly changing and the treatment thus needs to change accordingly. Ideally a patient therefore should seek a TCM many times till the illness is cured, which can be difficult in a busy life.

In China. many patients therefore often switch between TCM and WM during the course of an illness. For milder illness, like cough, they would try TCM herbal medicine first. If it does not help, they will seek WM, as WM is considered to be faster in its action. The purpose is to gain symptomatic control and gets well. Finally they will again seek TCM to clear the root of the illness.

With increasing age, chronic disease is becoming a great burden to many patients and health care systems. WM doctors and patients alike urge for effective treatment. Several systemic reviews were done in order to address the efficacy of TCM and chronic disease. TCM treatment, mostly herbal medicine or acupuncture, has shown to be beneficial for lower-back pain (41,42), tension-type headache (43), migraine (44), chronic neck pain (45), peripheral joint osteoarthritis (46), rheumatoid arthritis (47), atopic ezema (48), type 2 diabetes (49) and heart failure (50) etc.

In German several hospitals already provide TCM therapies in addition to WM (51,52). Even if there are only weak or no evidence supporting its efficacy, many patients are still willing to try TCM. After the treatment, a considerable number is convinced that TCM was actually beneficial. The study carried out by German doctors where they did a quality survey on the in-patient suffering from muscle-skeletal and neurological disorders receiving both WM and TCM therapy. The study shows that TCM could reduce intensity of complaints, improve quality of life, increase satisfaction in lifestyle areas, and fewer days off work.

In the future, more work needs to be done in order to address the effect of TCM on chronic disease. Well designed studies should be carried out.

TCM and cancer

It is a matter of fact that diagnosis of cancer is one of the most stressful experiences of modern life. A frequent coping strategy is change into a healthier lifestyle. It includes exercise, dietary restriction, vitamin or nutritional supplement. Based on the idea that TCM has a holistic approach to cancer and enhances general health, TCM is gaining increasingly popularity among cancer patients.

Many people who seek TCM, tend to think that TCM can improve symptoms, detoxify or boost immunity, boost energy, reduce the side-effects of WM anti-cancer treatment, enhancing quality of life or at least bolster psychosocial support. Some believes that TCM could slow the growth of cancer and prolong survival. Some patients are fully aware the incurable nature of their disease but are still hopeful of finding something to control the cancer and prolonging their life(53).

The TCM treatment for cancer, both itself and its complication, consists mainly of use of herbal medicine, acupuncture and diet. TCM focuses on the body-mind network. In TCM the malignant tumor is considered to be associated with stagnation of qi and blood. Qi is an abstract concept in TCM. Qi could be viewed as an ancient model for intra- and intercellular information transfer. In cancer qi is stagnated just as intra- and intercellular information is disrupted.

Destagnation is therefore the key to treat cancer in TCM. A very frequently used treatment is “Fu Zheng” treatment. Fu zheng could be translated as “correcting to the normal”. This is to strengthen the whole body-mind system by enhancing and harmonizing the energy balance between all the organs. This may be viewed as correcting an imbalance in the body-mind communication network and is reflected by an enhancement in immunity. Fu Zheng herbs include Rx Astragali membranaceus, Rx Paeoniae rubrae, Rx Ligustici Chuan xiong and Rx Angelicae sinensis etc. The molecular basis of herbal medicine has been suggested to be induction of cancer cell apoptosis, promoting immunologic response to cancer cells, anti-angiogenesis and regulating or inhibiting oncogene expression(54-56).

In addition the herbal medicine is also focusing on other aspect of cancer like fatigue, exhaustion, nausea, pain and other psychological illness. Those could be caused by disease, treatment or both of them. Acupuncture could be an equally effective treatment to drugs in patients suffering from mild depression(57) and is effective in managing short-term pain(58). In different cancer a wide range of herbs are used to treat vegetative symptoms (59-61).

As more and more patients take TCM in combination with WM, we have to be aware of possible side-effects of TCM. It includes abnormal liver function tests, unexpected severe myelosuppresion, haemostatic defects, renal functional impairment(19). Interestingly many TCM practitioners claim that by using the right herb patients would gain benefits such as myeloprotection, hepatoprotection, neuroprotection, nephroprotection and gut mucosal protection. What went wrong was that WM doctors have to applied to herbs according to TCM diagnose criteria.

There is an interesting article by Tai Lahans(62). She describes one of her patient's encounters with integrating Chinese and WM treatment. The patient is diagnosed as colorectal cancer with Duke's stage C adenocarcinoma; T2,N1,M0. Lahans also gives the patient a diagnose based on TCM which is "above plus Damp heat with Liver and Kidney Yin deficiency." The pathogenesis of the colorectal cancer according to both TCM and WM is discussed. The patient was treated with WM surgery and chemotherapy 3 weeks post surgery. What is special is that the patient received TCM decoction pre- and post-surgery. The treatment all in all was successful and he is now cancer free ten year later. The article tells us that whether we view the disease from TCM or conventional point the patient is still the same. Both TCM and conventional medicine are the models we make in our attempt to understand the human body. So when a patient has colorectal cancer with Duke's stage C adenocarcinoma; T2,N1,M0 in conventional medicine and above plus Damp heat with Liver and Kidney Yin deficiency in TCM, we are dealing with the same disease put in different language.

TCM education in China

Previously, TCM was taught as “Family education” and “apprenticeship education”, where a senior doctor had several students and taught TCM both in theory and practice. It resembled much of the other CAM when it was not systematically taught in institution. Later on in Tang Dynasty around 700 AD, government started TCM Taiyishu(太医署), which was a school to train TCM doctors specifically for the imperial officer.

After the formation of the people’s republic of China TCM education was drastically changed. Today TCM is taught in different levels. TCM could be studied on either full-time or part-time. Part-time studies are mostly for people who is already working but is interested in TCM or want to become a TCM doctors. There is also some WM doctors studying TCM as a complementary educaton and participate at TCM night school.

Full time TCM education in colleges and universities has also different levels. There are 3-years diplomas, 5-year bachelor degrees, 7-years combined bachelor and master’s degree and postgraduate research programs. In China today there are 33 TCM colleges and universities and about 30000 students are undertaking higher TCM education(63). The different levels of higher education is thought to meet the different needs for competence in the health care system of China.

The Chinese Ministry of Health emphasizes the importance of integrating TCM with modern science and technology (64). Regardless the level of TCM education in China, since 1958 they all have integrated some knowledge of WM in their curriculum. Since 1962 all TCM colleges or universities have offered electives in WM. At the Beijing University of Traditional Chinese Medicine the ratio between TCM and WM is 6,7 to 3,3 (63), but not all TCM educations have that high ratio of WM. TCM colleges and universities also encourage foreign students come to China and study TCM as they see it as a way to promote TCM internationally.

Own observations and experiences

Xiyuan hospital has a blend of TCM and WM as most of Chinese TCM hospitals are nowadays. I was surprised by Xiyuan hospital modernity and the many similar features shared with WM hospital.

Xiyuan hospital has an organization that resembles WM hospital. In addition to the specialiced TCM departments like department of acupuncture and department of qi gong, departments had names according to WM classification, like department of cardiovascular disease, department of urology, department of General Surgery etc. This is, however, not according to the idea of TCM as a holistic medicine. The time before modernization of China, TCM doctors were not meant to have any specialization as done in WM. Most TCM practitioner has a setting that resembles more like today's GP setting where a doctor has patient with a whole range of different diseases and take care of them by himself and rarely refer them to other doctors. Minor surgery was achievable but major surgery like AAA was inconceivable. This reflects TCM's focus on the internal aspect of human body and lack of anatomical knowledge.

Xiyuan hospital has modern diagnostic tools including ultrasound, x-ray, CT, MRI and scintigraphy. They also have advanced clinical biochemical laboratory for analyses of blood, urine, feces, spinal fluid and in addition Microbiology and Patology. The diagnostic tools are used frequently. The TCM doctors often use them to aid them in diagnostic, disease progression and in following the therapeutic effects.

During my stay I was present to an emergency situation where a patient had an anaphylactic shock. The staff acted according to WM management: position, adrenalin and intravenous fluid etc. Interestingly, the patient was not anaphylactic to any TCM herbal decoction or any other TCM treatment, but was getting his first chemotherapy when the anaphylaxis took place. This is consistent to what the TCM doctors told me. They seldom experience adverse effect from TCM therapy. They regard WM treatment to be "harsh" while TCM treatment is more "soft" and meant that was why there is less adverse effect from TCM than WM. During my stay I never notice a single case where the inpatients had a serious adverse effect of TCM treatment.

To me it was interesting to experience that a TCM doctors actually did not pay much attention on working mechanism of TCM herbs, at least not in the sense of WM which devotes a lot of research on the working mechanism of a drug. When prescribing a herb formula or combination, the TCM doctors considered the symptoms of the patients then consider what kind of herbs could counterattack the symptoms. (hvordan foregikk det i praksis: slo de opp i bøker eller hadde de standard-kombinasjoner. Var det stor variasjon?)

The TCM doctors at Xiyuan hospital were eager to tell me that in TCM there are four major diagnostic methods.

1. Inspection
2. Listening, smelling and inspection of the tongue.
3. Radial pulse palpation.

4. Anamnesis or inquiry

That is pretty much what we have in WM. The special and mysterious to a WM-doctor is diagnosing by looking tongue and by radial pulse palpation. TCM claims that the tongue and the radial pulse are closely connected with qi, blood and internal organs through meridian. For this reason careful inspection of the tongue will aim the doctors to understand the condition of qi, blood and internal organs of the patient.

Tongue and radial pulse diagnostic needs experience and distinguish a good TCM doctor from the rest. That is why people generally prefer older TCM doctors who have accumulated experiences through years of practice. There are several “hero” stories from ancient time when a good TCM doctors is able to tell what is wrong with the patient just by looking at the tongue and then palpate the radial pulse. At the hospital manydoctors told me that they can differentiate the number and sex of the fetus by only palpating the pregnant mother. I witnessed 3 pregnant mothers got diagnosed by radial pulse and was amazed when the doctor got right all the three times. I have, however, not seen any valid statistics on the true effect of this diagnostic method, which in part resemble some of the method used by doctors and midwifes in WM prior to the ultrasound diagnostics.

I had the opportunity to talk to several patients during my stay at Xiyuan hospital. The patients generally were satisfied with combined treatment with WM and TCM. Many of them came to Xiyuan hospital because they meant that TCM had less adverse effects and that the TCM physician generally had more time with the patient and cover more aspect of the disease. Finally they all believe in that a “super-doctor” who is skilled in both WM and TCM, has to be better than a “pure” WM or TCM doctor. As I was told many times during my stay, both from patients and doctors: “Why not use TCM when you have access to it? TCM is the wisdom that has stood the test of the time”.

Conclusions

It has been educational and thought generating to have had the opportunity to learn more about TCM; - from a historical point of view, but also from the perspective of to-days medicine with the merging of parts of WM both in the education of TCM and in the Chinese diagnostics and treatment regimens. *In my opinion* it must be beneficial to the patients in a high-tech tertiary hospital to come to a hospital where TCM and WM are partially merged. The WM, with *modern diagnostic tools* makes the diagnostics more complete and precise, and modern WM treatment makes the recovery faster and more efficient. However, as many of the patients in the hospital are more prone to have complex and serious diseases, I think the holistic approach of additional TCM may reduce some of the many adverse side effects of WM and give the patient as a whole, with body and soul, a better treatment.

Unfortunately, I only had the chance to observe TCM in a modern high-tech tertiary hospital setting and did not have time and possibility to observe TCM in a rural or community practice. I remain curious to what extent the TCM remained "pure" and to see how TCM works alone with its relatively primitive and low cost diagnostic tools. As mentioned above, years of experience is needed in order to become a good TCM practitioner and the action of TCM treatment is often quite slow. I look forward in the future to see how the quality control of TCM treatment in the community and how we could address the effectiveness of TCM scientifically.

Obviously there is a lot of work need to be done in order to prove its efficiency and acknowledge TCM. Factors such as use of complex, individualized treatments, lack of standardization of herbal medicines, consistency of quality and safety among different batches of herbal drugs difficulties in randomizing and in identifying appropriate placebo intervention are obstacles which needed to be solved.

In addition, the TCM language is difficult to understand even for Chinese people, like "*syndrome with yang-deficiency with qi stagnation*" or "*syndrome of detriment to yang affecting yin*". I think that it is helpful for the patient to have a diagnosis that they can more easily understand and relate to, more like the reductionalistic diagnostic classifications in WM. TCM requires in depth knowledge in traditional Chinese literature and philosophy, a knowledge *not shared by the average Chinese today*.

TCM has gained increasing popularity in our Western part of the world. As a result WM doctors experience that patient ask for the doctor's opinion about TCM, especially acupuncture. As WM doctors, I think that we should be open-minded and should not have any prejudice. We should not we persuade or forbid the patient seeking TCM. Instead we should educate the patient on what we do know about TCM and what is the potential risk and benefit. Including CAM and TCM medical education might be helpful. In the Oslo medical curriculum there is an optional course in CAM where TCM is included.

All in all I find TCM very interesting and I am intrigued by its unique way of holistic thinking. During my work with this thesis I also learned a lot about WM and became aware of some of its flaws. I think this will help me to be more critical in my future work as a doctor, beneficial to my patients. I think it is important to recognize the

potential that lies within TCM and what it might contribute to improve medical health in general. Furthermore, WM would benefit of the more holistic approach and the possible advances in therapeutics that may lie in the ideas of TCM. The biggest challenge is to extract what is the best from each system and find the individual balance appropriate for each patient.

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