PERSPECTIVE

Traditional Chinese Medicine: A Brief Outline

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INTRODUCTION

The traditional medicinal therapy of China is increasingly a focus of attention as a potential source of new drugs. This year, the on-line appearance of the *Electronic Dictionary of Chinese Medicine* (*E-DCM*[1,2]), a substantial encyclopedic reference work, provides a readily searchable electronic database that, among other things, offers copious information about the traditional use of the Chinese *materia medica*. Nevertheless, many researchers in the field of medical chemistry find Chinese medical literature opaque, and although the *E-DCM* contains much basic-theory information, many users would undoubtedly appreciate an introduction to the subject. With a view to meeting this need, this paper offers a historical sketch of the development of Chinese medicine and a brief outline of its principal features.

At the outset, it should be noted that "Chinese medicine" is an umbrella term for the numerous healing arts of China that include medicinal therapy, acupuncture, massage, cupping, etc. It is a literal translation of the Chinese *zhong yi*, by which name it is has been referred to in China since the adoption of Western medicine. It is often referred to as traditional Chinese medicine (TCM) in English. Given the influence of China in the Far East, these healing arts spread to Korea and Japan in the first millennium, and some of the traditions that developed in these countries have also found their way to the West. For this reason, some people favor the term Oriental medicine or East Asian medicine.

HISTORY

Formative Period. Chinese medicine as we know it today has a history of more than 2000 years. In that period of time it has undergone constant change and development. The body of knowledge that has been received in the present and its historical development have been described by various writers.[2−6]

Up until the second century B.C., disease was largely attributed to the work of ancestors, spirits, and demons, and it was prevented and treated by propitiating the ancestors, spirits, and demons. These beliefs in the influence of supernatural forces over human health have taken on different forms in time, but they have existed down to the present.

In the second and first centuries B.C., a new understanding of the body and its afflictions grew up alongside the old one and partly replaced it. According to the new view, health and sickness, rather than being the result of ancestral or demonic spirits, conformed to natural laws, and mastery of these laws would permit intervention in morbid processes and restore the body to health. This revolution did not arrive spontaneously; rather it came in the wake of the flowering of philosophical thought, which viewed, among other things, the health of society as subject to natural laws of the Dao. The three major schools of philosophical thought were the Daoists, the Legalists, and in many respects most importantly the Confucianists. According to Confucian thought, social stability could be ensured when each individual performed his social duties correctly, and health could be preserved by adequate food and clothing and a by temperate lifestyle.

Adequate diet was needed to maintain the strength of the body, but excesses of food and drink and of sexual activity were to be avoided, since these were observed to have deleterious effects. Environmental influences such as cold, heat (fire), wind, and dampness were also observed to cause illness. Yet these were less likely to affect a body that was adequately, and not excessively, nourished. The environmental influences, which were seasonal in nature, were considered to be capable, especially in weak health, of entering the body and lodging in certain places. Disease could be prevented by avoiding, or ensuring physical protection against, such influences and treated by eliminating the offending influences and restoring weakened aspects of bodily functions.

This deterministic approach entailed recognizing the body to be composed of parts, each of which had a function in maintaining the health of the body. The functions of internal organs are described in the *Huangdi Neijing* ("Yellow Thearch's Inner Canon"), the first major medical text from the Early Han (first and second century B.C.), but the authors do not provide a comprehensive rationale for their conclusions and we can only infer their reasoning from the conclusions themselves and from the historical context in which they arose.

We may safely assume that some of the functions of the internal organs were deduced from external observations of biological activities (eating, defecating, and urinating) and a rudimentary knowledge of internal anatomy. We would imagine that instinctive awareness of the need for food to maintain life and observation of the contents of the stool would have prompted the notion of a tract running from the mouth to the anus that conducts food, transforms it, and extracts from it what is necessary for the maintenance of bodily function. Similarly, we may assume that the notion that the lung extracts something from the air vital to human life was deduced from respiration. Again, we may presume

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that the idea that the bladder stores urine produced by the kidney was deduced in the same way. By contrast, the functions of the heart, liver, and gallbladder are not directly related to outward biological activities.

The ancient Chinese performed rudimentary dissection. The *Huangdi Neijing* describes the shape and size of the major internal organs. Nevertheless, anatomy never developed beyond this, a fact usually attributed to the Confucian taboo against tampering with the body of an individual in accordance with the notion that it was unfilial toward the individual's parents. There never developed in China any idea similar to the one that has become predominant in the West that the *function* of organs must be understood purely in terms of their *material structure*.

The internal structure of the body only revealed a limited amount of information concerning physiological functions. This was complemented by speculations originating outside the body. The theories that were applied were those of yin-yang and five-phase (*wu xing*), which are often called *systems of correspondence* by modern scholars. These systems of correspondence are thought to have their origin in magical notions of ontological connections between like phenomena.[7] The following quotation reflects a belief that rulers could influence the world through the yin-yang system of correspondence:

"The most important concern of the state, upon which hinges the preservation of natural and social order, is the marriage of the prince. If the union of the king and queen is not complete, the order of the universe is disrupted. If one partner oversteps his rights, eclipses of the sun and moon occur. "The son of the heavens controls the movement of the masculine principle [yang], his wife controls the movement of the feminine principle [yin]"."[8]

As the yin-yang doctrine evolved into a deterministic doctrine, magical influence gave way to cosmic resonance. Things and phenomena that had natural complementary opposites could be classified as either yin or yang according to not only their nature but also the relationship and interaction between the two: heaven and earth; day and night; spring and autumn; summer and winter; male and female; dark and light; upward and downward movement.

In medicine, yin and yang classification of body parts, internal organs, and physiological substances and their upward and downward and inward and outward movement in the body was combined with the understanding of basic physiological processes inferred from rudimentary anatomical observations. Yin and yang did not shed much light on the detailed workings of the internal organs, but they furnished a productive basis for understanding relationships between them and notably fostered the understanding of etiological processes.

The doctrine of the five phases was a system of correspondences that was based on five positions instead of the two of the yin-yang doctrine. At first, there were apparently difficulties in applying the five-phase doctrine, since the internal organs were differently attributed to the phases by different writers and at different times. So long as the Han Dynasty was associated with the earth phase, the heart, which in the Zhou period had already been designated as the most important organ, was considered to belong to the earth phase. Yet with the beginning of the Later Han period, fire came to be identified with this dynasty, and so the heart came to be equated with fire.[9]

The *five phases* in the past were often referred to in English as the *five elements* because of a supposed similarity with the *four elements* of ancient Greece. Yet while the Greek counterparts were considered to be four basic types of matter that in infinitely varied combinations created the material variety of the world, the Chinese phases represented types of activity. This notion is highlighted by the word *xing* (movement, action), though belied by the symbols wood, fire, earth, metal, and water. Nowhere is this more in evidence than in the classification of the activity of nature in the seasons. Wood denotes the expansive movement of nature in the springtime; fire, the heat of summer; earth, the fructification in late summer; metal, the sharp curtailment of activity in the fall; and water, the dormancy of nature in winter.

The association of the five phases with the seasons is clearly visible in at least two of their connections with the five major internal organs. One example is the spleen and stomach. The spleen, it must be understood, was considered the internal (yin) counterpart of the stomach (yang), apparently on the grounds of its proximity to the stomach. The spleen and stomach were considered to assimilate and distribute the "essence of grain and water" (nutrients in foods) around the body. This understanding was apparently based on the analogy of earth as the source of crops that provide food. The kidney, associated with the bladder perhaps on anatomical evidence, was considered to be the viscus of water (urine). We might speculate that it was by the association of water with winter, the time when most plant life is "stored" in the form of seeds, that the kidney was also considered to store the "essence" of the body, which explained not only reproduction of the organism but also the processes of development and aging. The five phases apparently facilitated an explanation of the liver's function. The liver's qi is said to like "orderly reaching", like the outward thrust of plant growth.

The yin-yang and five-phase doctrines did not determine the Chinese medical model in isolation. The formative period of Chinese medicine was not only influenced by a newly born determinism in social and health regulation; it was also influenced by economic, social, and political events in China in the Qin.[10]

The initial unification of the Chinese empire by the first emperor of the Qin Dynasty (reigned 221−206) introduced a completely new state structure such as had never been known before in China. Different parts of the country grew together as they became linked through a system of roads and waterways. Harmonization of weights, measures, and writing contributed to the integration of the lives of formerly separate political entities into a monolithic empire.

The human body came to be viewed as an empire. Individual organs had been known for a long time, just as individual vessels running through the body had been. Yet it was not until the late second or even the first century B.C. that these individual parts grew together producing an organism in which each organ was dependent on the others and contributed in various ways to supplying the needs of the body as a whole.

The medical texts that were placed in the Ma-Wang-Dui tombs in Chang-Sha before they were sealed in 167 B.C.

discussed 11 vessels within the body. At that time, these 11 vessels were understood to be separate and independent. Later, as we see from the *Huangdi Neijing* compiled in the first century B.C., the 11 separate vessels gave way to the notion of 12 channels connected to each other, forming a circuit and traversing all major areas of the body. The notion of interlinking vessels was gradually refined into a complex system of channels (*jing luo*), which, like the roads and waterways of the unified empire, penetrated the whole body and the limbs, as well as the internal organs, and thereby connected them. Twelve main channels (*jing*) were connected with network vessels (*luo*) densely distributed throughout the body.

The system of channels and network vessels complemented an older conception of the blood vessels. For a long time, the blood vessels, visible under the skin, had evidently been a focus of diagnosis and treatment. Determining whether the veins were full or empty and whether the skin covering them was smooth or rough furnished data about the state of the patient. Fullness was treated by bleeding, and emptiness by the application of heat according to purely physical laws. Probably in the second century B.C., the Chinese came to recognize, in addition to blood, a vaporous agent, qi, to be of vital significance. Qi flowed, most importantly, in the channels permeating the deeper levels of the limbs and body and was supplemented or drained not with the pointed bloodletting stone but with fine needles.

Evidence of influence of the organization of human life on the understanding of the human organism is by no means confined to transportation. The political and social spheres also left their mark.

Acupuncture and Medicinal Therapy. According to the view of the organism that responded to the Confucian−Legalist world view, the individual organism was like the empire in which a well-organized political hierarchy ensured the smooth interaction of all parts. "Evil" forces could attack from without or arise within. These were kept in check by the forces of "right". The strength of the right forces was to be maintained, and this could be assisted by manipulating the flow of qi by the insertion of needles at certain points in the body known to be particularly responsive, rather in the way that governments make adjustments in one or another part of the economy to maintain, restore, or improve general prosperity. Because the aim was to achieve maximum effect by minimum intervention, the notion of "treating disease before it arises" (*zhi wei bing*) was of great importance. The great organizing principles of yin-yang and five-phase systems of correspondence tied in with this conception. This view is only partly represented in the *Neijing*, but the *Nanjing* ("Classic of Difficult Issues"), a treatise appearing in the Later Han, or first and second centuries A.D., consistently follows a systematic correspondence approach and, thus, marks its consummation.[11]

The medicine of systematic correspondence and needle therapy thus responded to the world view of the elite classes of a large empire. It held less sway over the masses, for whom the vicissitudes of life were in many ways more closely associated with the forces of nature that determined whether the harvest was lean or fat. Although the Daoist to a great extent shared the belief that the individual was responsible for his own moral conduct and physical health, they sought a happy existence through the understanding of nature and abidance by its laws. It is for this reason that the Daoists were attracted to healing methods utilizing the products of nature. Not surprisingly, the earliest materia medica literature contains virtually no mention of yin-yang and the five phases or any other explanatory theory and is pragmatic: certain plant, animal, or mineral products are effective for treating certain diseases or conditions.[12]

While the Ma-Wang-Dui manuscripts, the *Huangdi Neijing*, and the *Nanjing* inform us of the formative phase of the medicine of systematic correspondence, pharmaceutical literature from the same period is unfortunately lacking.

The two traditions never completely merged but were not entirely separate, and the first attempt to unite them was made by the Later Han physician Zhang Ji shortly after the appearance of the *Nanjing*. Zhang Ji presented ideas concerning the passage of evils through the channel system into an empirically based theory of *cold damage* (*shang han*, roughly corresponding to our notion of febrile disease), providing for the treatment of these a detailed set of formulas. Zhang's understanding of cold damage diseases is seen to stand in direct lineage to the statements on the subject in the *Huangdi Neijing*, *Su Wen* (chiefly in the *Relun*, "On Heat"), which are of a scant and highly theoretical nature. Zhang's contribution was that he adapted the *Neijing* ideas to form a theoretical framework that could embrace an immense wealth of clinical experience.[13] Since Zhang's primary form of therapy was the use of medicinal agents, he, apparently for the first time, created a synthesis between the medicine of systematic correspondence, which otherwise used needling as its main form of treatment, with medicinal therapy. In his own time and for centuries to come, acupuncture and medicinal therapy led relatively separate existences, and it was not until the Song Dynasty that Zhang's synthesis could become part of mainstream trends in medicine.

Later Developments. Zhang Ji wrote of his understanding of febrile in his *Shanghan Zabinglun* ("Treatise of Febrile and Miscellaneous Diseases"). The original text did not survive the turbulence of the Three Kingdoms period (220−265) fully intact, but was pieced together by Wang Shu-He (210−285) from remaining fragments to form *Shanghanlun* ("On Cold Damage"). Wang Shu-He is also known for his contribution to the art of pulse-taking. His understanding of the pulses came ostensibly from Zhang Ji, but his *Maijing* ("Pulse Canon") is noteworthy because it introduced for the first time detailed definitions of numerous pulse conditions.

Acupuncture and moxibustion continued to make advances. In the third century, *Zhenjiu Jiayijing* ("The Systematic Canon of Acupuncture and Moxibustion") by Huang-Fu Mi listed 300 acupuncture points on the 12 regular channels and 49 on the two midline channels, that is, 649 of the 670 points discussed in modern literature. This represents a substantial expansion over the *Neijing*, which contained only 295 of the current 670.[14] However, Huang-Fu Mi offered no fundamental innovations, nor did the next major medical writer after him, Sun Si-Miao (A.D. 581−682?), who compiled voluminous prescription works.

In the seventh century (Tang Dynasty), Wang Bing produced a revision of the *Su Wen* ("Elementary Questions") that notably included a highly complex body of knowledge, allegedly handed down from antiquity, explaining the relationship between illness and occurrences of rain, wind,

dryness, cold, and heat in the course of the four seasons and over the years. This doctrine (described in Unschuld 1998) became formalized as the five periods and six qi doctrine (*wu yun liu qi*).

With the development of neo-Confucianism (*li xue*) in the Song Dynasty (960−1279), intensive efforts were made to verify the validity of the medicine of systematic correspondence by extending it to practical medicinal therapy. Before the Song, whereas 100 books on acupuncture, 50 on physiology, and 70 on the pulse had appeared, fewer than 10 works had followed up Zhang Ji's integration of medicinal therapy into the principles of systematic correspondence. It was not until this period that Zhang Ji's approach became mainstream.

Since antiquity, the qualities of edible substances had been determined by their flavors and nature (meaning degree of hot or cold). In the theoretical literature, these qualities had been discussed as abstractions and in their significance for dietetics. The *Huangdi Neijing* states "Heat is treated with cold; cold is treated with heat." In the late Song, authors integrated flavors and natures into the yin-yang and five-phase framework. Flavor was defined as a yin quality, and nature, as a yang quality. Warm, hot, and balanced temperatures of a drug were considered strong qualities and hence as yang in yang; cold and cool temperatures were considered weak qualities and hence yin in yang. Sour, bitter, and salty were considered to be strong flavors and rated as yin in yin; acrid, sweet, and neutral were interpreted as weak flavors and therefore characterized as yang in yin. In a five-phase classification, salty and warm qualities were ascribed to wood, sour and hot qualities to fire, sweet and balanced qualities to earth, bitter and cool qualities to metal, and acrid and cold qualities to water. Through the five-phase system, certain affinities were established between drug qualities and the internal organs.

The Ming Dynasty was a high point in medical literature. A major publication was the *Bencao Gangmu* ("The Comprehensive Herbal Foundation") written by Li Shi-Zhen and published in 1590. It comprehensively presents the contemporary pharmaceutical knowledge. It discusses 1892 medicinal substances and contains over 1000 illustrations and over 10 000 medicinal formulas. The information provided for each medicinal includes explanations of names, information about nature and flavors, and instructions for processing. Similarly comprehensive works were also produced in the field of acupuncture.

So far in the development of Chinese medicine, Zhang Ji's *Shanghanlun* had constituted the only theory-based understanding of febrile diseases. Zhang's understanding of these diseases was that they were predominantly caused by wind and cold—hence the title of his book, "On Cold Damage". However, another cause of febrile disease, warm evil (*wen xie*), had been mentioned in the *Neijing* and recognized by Zhang Ji. In the Ming Dynasty, writings on warm diseases became more prolific. This development appears to have been attributable on one hand to the opening up of the south of China, where febrile diseases tended to be of a different nature than in the north, and on the other to pestilences arising as a result of wars. In this period, Wu You-Xing in *Wenyilun* ("On Warm Epidemics", published 1642) explained in detail the laws governing the origin, development, and pattern identification of warm epidemics. Notably, he posed the etiological notion of a contagious *perverse qi* (*li qi*). This notion represented a break away from the traditional conception of febrile diseases being caused by climatic influences (e.g., the wind and cold of the cold damage school) and made a great contribution to the foundation of the doctrine of warm diseases. In the Qing Dynasty, a comprehensive doctrine of warm diseases began to emerge. Ye Tian-Shi in *Wenrelun* ("On Warm Heat", 1746) introduced the four-aspect (defense, qi, construction, and blood) pattern identification system. Xue Xue in *Shire Tiaobian* ("Systematized Identification of Damp-Heat", 1831) described in detail damp-heat disease patterns. Finally, Wang Shi-Xiong in *Wenre Jingwei* ("Warp and Weft of Warm Heat", 1852) brought together all the theories of his predecessors in a complete doctrine of warm diseases.

As many examples have shown, Chinese medicine was never an integrated system but an accumulated body of knowledge. Although new insights continually appeared, older ones were not discarded. As time went on, the earlier classics gained rather than lost in value, and the formative period of Chinese medicine came to be looked upon as a golden age unsurpassed by later generations. Chinese medicine never developed a mechanism for separating fact from fiction to everyone's satisfaction. It never developed the notions basic to the modern Western sciences (including Western medicine) that any explanation of any phenomenon (or procedure) must be demonstrable by repeatable experiment and that the simultaneous existence of two different theories concerning a single phenomenon necessarily entails at least one of them being wrong. This fundamental weakness in the structure of Chinese medical knowledge only became apparent as Western learning began to enter China in the 19th century.

Chinese Medicine in the Modern Era. Modern Western medicine began to enter China from the middle of the 19th century through the efforts of Christian missionaries. By 1850, 10 missionary hospitals had already opened, and their numbers gradually increased. It was not by the power of the missionaries' religion, though, that Western medicine gained a fast foothold in China but rather by the power of Western civilization based on secular knowledge. By the end of the century, after decades of humiliation by Western powers and, finally, by Japan, China's faith in its own intellectual traditions was deeply shaken, and the values of modern science were seen by an increasing majority to offer the only possible solutions to the nation's problems. In the political realm, this development inspired the overthrow of imperial rule and the founding of the Republic.

Amid these upheavals, Chinese medicine was increasingly viewed as unscientific and primitive and all but met its demise. In 1929, a bill was presented by Yu Yun-Xiu for the "abolition of the old medicine". Although opposition was strong enough to prevent the bill from going through, the challenge to Chinese medicine remained unabated. In 1932, the Chinese government ordered that Chinese medical schools be excluded from the mainstream education system.

Chinese medicine gained a reprieve on the mainland in the 1950s after the communist assumption of power there. Two reasons have been suggested to explain the support of Mao Ze-Dong's government for Chinese medicine. One is that China did not have the resources to provide adequate Western medical health care for the whole population and

that there were still many practitioners of Chinese medicine.[15] The other is that traditional Chinese medicine contained a strong pragmatic element and its yin-yang and five-phase theories were considered as a kind of primitive materialism.[16] Nonetheless, not all traditional Chinese healing practices received communist approval. Chinese medicine was considered as a "treasurehouse" of experience in the treatment of disease, in which, nevertheless, the grain still had to be separated from the chaff. The PRC accords much less importance to Chinese medicine than to Western medicine; the medical education that it provides trains at least twice as many in Western medicine as in Chinese medicine.[17]

In Taiwan, where choice in health care has been left largely to the individual, Chinese medicine has remained alive out of popular assent and over recent years has been incorporated into the island's national health insurance scheme. Nevertheless, support for Chinese medicine is even weaker in Taiwan than in the PRC: Taiwan had nearly three times as many Western medical doctors than Chinese doctors in 1954 and 10 times as many in the early 1990s.[18] No government-run university has a Chinese medical faculty.

The challenge of Western medicine and the scientific world view has brought numerous changes. Only those elements of traditional healing practices that have a rational theoretical basis have been deemed acceptable. In the PRC, magical and shamanistic practices have been eradicated, but even in Taiwan, where they have been allowed, they have not been considered by educators to be valid elements of the Chinese medical corpus. At the same time, importance has been accorded to scientific research to establish the scientific basis of Chinese medicine. This has led to the scientific understanding of various therapeutic mechanisms and provided ample evidence of the effectiveness of both acupuncture and medicinal therapy. However, the theoretical infrastructure of the system as a whole has not been validated. Notably the channel system, certain organ functions, and external causes of disease traditionally recognized have gained no substantiation. Western research into acupuncture has led to the discovery of endogenous opioids, but the traditional concepts of qi and its pathways that provided the traditional explanatory model of the therapy have not been shown to have any objective referents.

Policy makers in both the PRC and Taiwan have declined to draw the most radical conclusions of the scientific challenge, which would entail discarding all traditional theories of physiology and pathology and recasting traditional therapies in the mold of mechanisms recognized by modern medicine. The traditional edifice of Chinese medical theory has been left intact but not entirely unaltered.

The teaching of Chinese medicine was traditionally based on the student−master relationship. In the classical tradition, the earliest knowledge had more importance than the latest. The authors of the early texts were considered to have knowledge so deep that later generations could only approximate it. Texts such as the *Huangdi Neijing*, *Nanjing*, and *Shanghanlun* were often closely studied and even memorized. The shift into the framework of large teaching establishments has led to the creation of new texts that explain the subject systematically in modern Chinese. The fact that study of the classics is giving way to short quotations in textbooks that present modern doctrines of traditional Chinese medicine[19] does not simply reflect a desire for greater educational efficiency; it almost certainly reflects falling estimations of the value of classical literature.

Education in basic theory still includes yin-yang and the five phases, the channels and networks, causes of disease, and traditional physiology, more or less according to the contents of the *Neijing*. Diagnosis is still presented in the form of the four examinations, which combine a wealth of diagnostic criteria from a wealth of literature. Inevitably this involves presenting different, even conflicting, diagnostic ideas such as different theories concerning how various parts of the tongue or the various vertical and horizontal divisions of the pulse corresponded to internal disturbances. The study of externally contracted disease is explained in traditional terms, even though this involves presenting two different schools of thought, that of "cold damage" (*shang han*) and "warm disease" (*wen bing*).

Central to diagnostic procedures in modern education is the practice of determining treatment on the basis of "disease patterns" identified (b*ian zheng lun zhi*). The notion of the disease pattern can be traced to the *Neijing* and underwent development by Zhang Ji, but explicit formulations of it in modern texts, such as the eight principles, qi and blood pattern identification, and bowel and visceral pattern identification, did not begin to develop until the Ming and Qing (1368−1919).[20] Treatment by identification of patterns is a key element in modern Chinese medicine on the one hand because it is theoretically based, rather than a symptomatic approach, and on the other because it is a holistic complement to Western medicine that emphasizes the individual's particular manifestations of disease.

The ways in which Western medicine has influenced the practice of Chinese medicine have not been systematically studied. But there are some well-known examples. Jaundice, which was traditionally explained largely in terms of damp-heat and the spleen, is now explained in terms of the gallbladder.[21] So strong is the new understanding of this condition that modern *Shanghanlun* commentators have introduced the notion of the gallbladder to explain Zhang Ji's approach to treatment.[22] Wind-stroke (*zhong feng*, apoplexy) is still explained in traditional terms of internal wind and various complications, but its Western medical understanding as a cerebrovascular disease has encouraged the use of blood-quickening stasis-transforming medicinals (*huo xue hu yu yao*). The Western cognitive esthetic of integrated knowledge was doubtlessly responsible for the idea of ascribing categories of medicinal actions to acupuncture points in the 1950s.

In promoting traditional Chinese medicine, the PRC government has hoped not only that Chinese medicine can be purged of all irrational theories and ineffective remedies but also that it can be integrated with modern medicine to produce an even more effective synthesis. These efforts are still hampered by the ultimate challenge that modern science poses: the theoretical edifice of Chinese medicine largely rests on speculation. There is no firm evidence for qi and the channel system through which it flows, for certain organ functions, for the activity of external evils in the body and other pathological processes, or for the nature and action of drugs as traditionally described. None of these traditional concepts can be accepted by the Western medical community, yet their abolition would reduce the value of Chinese medicine to an assorted collection of folk remedies.

The future survival of Chinese medicine will undoubtedly entail continuing change under the pressure of modern medical knowledge and the gradual disappearance of the social and cultural motivation of its traditional development. The nature and scope of the changes, as well as the pace of change, still cannot be perceived. Despite the changes that have visibly occurred in modern education, it is clear that so far the Orient has not been so bold as to discard all speculative concepts, since this would lead to a total collapse of the traditional theoretical basis of Chinese medicine.

Chinese medicine has undergone a degree of reacculturation in China (as it has in Korea and Japan). It is subject to the same pressure to validate itself in modern medical terms in its westward transmission, and there is also an antagonistic pressure to force Chinese medicine into the mold of a complementary health care, whose values are diametrically opposed to those of Western medicine. These pressures, combined with the lack of familiarity with the culture and language of China, have greatly affected the way in which Chinese medicine is presented in the West.

BASIC THEORIES

A brief description of Chinese medical theories should suffice for medical chemists interested in scanning Chinese medical literature to make rough sense of it. Chinese medicine understands the body in terms of gross organs; anatomy never progressed into the detail of anatomical structures. Hence, it has theories about what the heart does, what the kidneys do, etc.; it contains no statements about the ventricles, atria, or tubules. The biochemical aspects of the body are explained in terms of blood, the pneumatic substance qi, and the fluids; there is no chemical analysis. As an ancient understanding of the body, it is quite complex in its detail, but the broad lines are easily grasped.

It should be noted that in the present discussion, terms appearing, at least at the first mention, in quotes, are the English equivalents of Chinese technical terms. Terms that readers will find particularly useful to look up in *E-DCM* are italicized. Readers should be aware that the English terminology of Chinese medicine is not standardized and that many works use terms different from those presented here. Those desiring more detailed information can consult the basic primer that uses the same terminology as *E-DCM*.[23]

Yin-Yang and the Five Phases. "Yin" and "yang" are binary classifiers. The upper part of the body is yang; the lower part yin. The exterior is yang; the interior yin. Liquid and solid substances are yin, while the active substance qi is yang. Cold is yin; heat is yang.

Yin and yang are divisible and hence relative. Divisibility means that both yin and yang things or phenomena can be further divided into yin and yang. Thus the interior of the body is yin, but it contains yin and yang elements. The organs forming the digestive tract, which deal with substances that come from outside (the bowels, fu), are relatively exterior or yang, while the heart, liver, and kidney, which do not deal directly with external substances (viscera, zang), are relatively interior and yin. Both bowels and viscera have their substantial, yin aspect and their functional, yang aspect. The relativity leads to considerable complexity: the stomach, for example, as an internal organ is yin; dealing with contents from outside the body, it is yang. Furthermore, it has its own yin and yang aspects.

Yin and yang are not merely categories of nature but also relationship and interaction. Since yin is stasis and passivity and yang is movement and activity, yang phenomena are understood to activate yin phenomena. Thus, for example, qi is understood to propel the blood.

The five phases (wood, fire, earth, metal, water) are a 5-fold classification, whose major correspondences in nature are the seasons (spring, summer, long summer, autumn, winter) and whose major correspondences in the body are the five viscera (liver, heart, spleen, lung, kidney). As previously noted, the five-phase correspondences of the viscera appear to have contributed much to the traditional understanding of the viscera in the absence of anatomical data.

Like yin and yang, entities associated the five phases are understood to relate to each other in specific ways: as wood burns to produce fire, so spring gives rise to summer; as fire produces ashes (earth), summer gives rise to long summer. In medicine, these relationships are used to explain certain relationships between the viscera. Since these mainly apply to acupuncture, their discussion is here omitted.

Qi, Blood, Fluids, and Essence. Qi. The word qi originally meant vapor and came to be applied to various types of ethereal entities and phenomena such as steam, types of weather, breath, physical power, and life force. It is also applied to solid substances, particularly in their active aspect.

In the body, qi denotes breath and intestinal flatus, but importantly it also denotes subtle substances responsible for activity. In this latter context, qi is nowadays often misleadingly thought of as energy. To the ancient Chinese who devised the concept, qi was a subtle form of matter. Active, expansive, and without solid form, qi is a yang substance. Qi has warming, propelling, and retaining actions.

Different kinds of qi in the body are labeled according to their location and function. The qi that flows through the channels is called "*channel qi*". The qi that concentrates in the chest is called "*ancestral qi*". The active aspects of organs are their qi. For example, the stomach is responsible for intake and preliminary digestion, and when stomach qi is weakened, then the patient may experience loss of appetite and a sensation of fullness in the stomach.

Blood. This is considered to be a yin substance that carries nourishment around the body. It nourishes qi and is propelled by qi, and hence, it stands in yin-yang relationship with qi. Excessive bleeding or poor digestive function can cause insufficiency of the blood. Impact injuries and qi stagnation can cause blood stasis (nonmovement of blood).

Fluids. This can be any bodily fluid, including notably the "five humors" (tears, sweat, drool, snivel, spittle), each of which is associated with one of the five viscera. The fluids are easily damaged by febrile disease (giving rise to dry mouth and reddish urine).

Essence. This is the stuff that is stored by the "kidney" and that facilitates reproduction (semen) and controls the aging process. More under "kidney" is below.

Internal Organs. The bowels and viscera, the internal organs located in the trunk, are regarded as the major centers of physiological activity.

According to traditional understanding, the *spleen*, *stomach*, *large intestine*, and *small intestine* are the organs of digestion. The stomach "decomposes" (or "ripens and rots") ingested food and passes it on to the small intestine, where the "clear" part (nutrients) is separated from the "turbid" part

(waste). The spleen is said to absorb the "clear" part to make qi and blood and hence is considered (wrongly according to modern medicine) to be the chief organ of digestion. The turbid part goes on to the large intestine to be formed into stool and passed out of the body.

When stomach function is weak, there is loss of appetite and bloating. When spleen function is weak, any of many conditions may arise, such as abdominal distention, rumbling intestines, diarrhea, or emaciation.

The *lung* draws in air ("great qi") from outside the body to contribute to the body's qi. When the lung is healthy, its own qi (functional force), keeps the voice and nose clear and prevents fluid from rising up and collecting within it. According to traditional theory, the lung is also responsible for making blood red. Disease affecting the lung is characterized by cough, hoarse voice, nasal congestion, and panting (i.e., dyspnea).

The principal function of the "*heart*" is "storing the spirit", i.e., acting as the seat of consciousness. It was known to be related to the blood vessels, but there was no notion of circulation in the modern sense. Signs associated with heart disease include palpitations, insomnia, excessive dreaming, and "*vexation*" (feeling of restlessness focused in the chest) during the daytime.

The "*liver*" is said to "store blood" when the body rests and send it out when the body is active. It is also believed to govern the movement of qi around the body. Globus hystericus, goiter, pain and discomfort in the sides of ribs (along the pathway of the liver channel), distention and pain in the breasts before menstruation, and menstrual irregularities are signs of "*depressed liver qi*". The liver governs the sinews, and various liver problems are characterized by spasm. It is also said to open into the eyes, and therefore, many eye problems are attributed to the liver.

The "*kidney*" is the organ of water metabolism, sending urine to the bladder. It is also believed to store "essence", the stuff that makes reproduction possible (e.g., semen) and controls the aging process (essence strengthens toward maturity and then weakens in old age). Kidney qi is responsible for retention of urine and semen, and when it fails to do so, a state called "*insecurity of kidney qi*", the result is enuresis, urinary incontinence, water swelling (i.e., edema), premature ejaculation, or seminal emission.

The ears are said to be the orifices of the kidney, and the lumbus is said to be the house of the kidney. Tinnitus, deafness, and lumbar pain are common signs of kidney problems. The kidney is also considered to be the root of the yin and yang of the whole body. Kidney problems are often associated with other problems. When kidney yin is depleted, liver problems arise. When kidney yang is weak, the heart or spleen are often also affected.

According to yin and yang theory, the internal organs classed as yin because they are in the interior of the body. But since yin and yang can be ever subdivided, there is a further division between "*bowels and viscera*". The "five viscera" (liver, heart, spleen, lung, and kidney) are said to store essence, while the "six bowels" (gallbladder, stomach, large intestine, small intestine, triple burner, and bladder) are said to convey waste. The viscera are most internal; the bowels are relatively external.

Each viscus is paired with a bowel: the liver with the gallbladder; the heart with the small intestine; the spleen with the stomach; the lung with the large intestine; the kidney with the bladder. The pericardium is evoked as an organ separate from the heart as the counterpart of the triple burner.

Table 1. Special Relationships of the Viscera

wood	fire	earth	metal	water
liver	heart	spleen	lung	kidney
gallbladder	small intestine	stomach	large intestine	bladder
eyes	tongue	mouth	nose	ears
sinew	vessels	flesh	skin, body hair	bone
anger	joy	thought	sorrow	fear
tears	sweat	drool	snivel	spittle

The viscera are preeminent. In accordance with five-phase theory, they are understood to have correspondences with various parts of the body. The liver, for example, "governs" the sinews (tendon and muscle) and "opens" into the eyes; its humor is tear fluid. Many afflictions of the eyes and vision are considered to be the manifestation of liver disease. The kidney "governs" the bones and "opens" into the ears; the lumbus is the house of the kidney. Weak bones in infants are considered to be due to insufficiency of kidney essence; chronic deafness and lumbar pain are considered to be due to an insufficiency of the kidney.

Mental states are associated with the five viscera. Anger is associated with the liver, thought with the spleen, joy with the heart, sorrow with the lung, and fear with the kidney. Excesses of these mental states can give rise to disease. The intimate relationship between mind and body suggested by this paradigm is one reason Chinese medicine has attracted interest as an alternative therapy over recent decades.

The special relationships of the viscera to other parts, to fluids, and to mental states can be schematically represented as in Table 1. In addition to the bowels and viscera, there is another group of organs called the "*extraordinary organs*", which includes the brain, marrow, bone, uterus, and gallbladder. They do no fit into the categories of the bowels and viscera because they do not convey waste or store essence.

Channels and Network Vessels. The main pathways along which qi flows are called "*channels*" (also called "meridians"); smaller branch lines are called "network vessels". Most of the needling sites, or "acupuncture points", as they are usually called, are located on the channels. Needles inserted at acupuncture points were traditionally believed to adjust the flow of qi to bring about specific therapeutic effects.

The channels and network vessels are most important in acupuncture. However, in the body of knowledge on which medicinal therapy is based, they are considered to transmit disease and the action of drugs.

There are 12 main channels, each with yin and yang designations. The yang channels run over the outward facing aspects of the body, while the yin channels are distributed over the inward-facing aspects of the body. Each channel "homes" to a viscus or a bowel and connects to the exterior−interior opposite, the yin channels homing to the viscera and the yang channels homing to the bowels. For example, on the one hand lesser yin channel homes to the heart and connects to the small intestine, while on the other hand greater yang channel homes to the small intestine and connects to the heart.

In addition to the 12 main channels, there are the so-called "*eight extraordinary vessels*", which chiefly act as reservoirs for the channels.

Causes of Disease. In Chinese medicine, disease is considered to be caused by physical injury, *external evils* (environmental factors such as wind, cold, damp, etc.), poor lifestyle, emotional disturbances, etc. These factors can conjugate in different ways.

"*Wind*","*cold*","*summer heat*","*dampness*", "*dryness*", and "*fire*", known collectively as the "six (environmental) excesses", are environmental influences. Summer heat is the torrid heat of summer, and fire denotes any untimely heat at other times of the year. These evils are understood to invade the "*exterior*" (the body's surface), giving rise to conditions we refer to as colds, flu, and upper respiratory tract infections. The external evils are understood to have a blocking effect. When the right qi of the body is obstructed, its warming force is weakened, so that there is aversion to cold, but at the same time, as it struggles against the evil, abnormal heat is generated, so that there is fever. When external evils obstruct lung qi, there are upper respiratory tract signs such as cough, runny nose, etc. When they block the channels, there can be headache or generalized pain.

External evils that have invaded the exterior can often be successfully resisted. If not, they advance into the body's *interior*. In the process, they often transform into heat, given rise to high fever.

Wind, cold, and damp may not only affect the exterior; they can also invade and obstruct the channels and network vessels, causing what we refer to as rheumatism, arthritis, or sciatica, called *wind-damp* or *impediment* (*bi*) in Chinese medicine.

Cold, wind, fire, dampness, and dryness (but not summer heat) can be of internal as well as external origin. They can arise in the body as a result of physiological imbalances or emotional disturbance. Internal dryness arises as a direct result of the insufficiency of the fluids. Internal dampness arises when the yang qi of the spleen fails to cope with all the incoming fluids. Cold and heat are understood to arise internally through yin-yang imbalances. According to the doctrine of yin and yang, cold and heat are regarded as mutually opposed and complementary opposites. Cold is not, as it is in modern physics, the absence of heat, but an entity opposite to heat. When the yin fluids of the body are damaged, the yang qi of the body becomes disproportionately strong, and internal heat (or fire) develops. When the yang qi of the body weakens, cold arises internally. The internal counterparts of external cold and heat express themselves somewhat differently. While external heat may be characterized by a high fever with sweating, internal heat manifests in heat in the palms and the soles and in night sweats.

Finally, "internal wind" (or "*liver wind stirring internally*") is the result of severe yin imbalances, such as insufficiency of the liver and kidney yin and hyperactivity of liver yang.

As previously noted, mental states (the "five minds" and "seven affects") are associated with the five viscera, and excesses of these can cause sickness. In particular, anger and frustration can impair the liver's free coursing function, causing "*liver qi depression*", which is "*qi stagnation*" due to internal causes. Excessive thought (hard mental effort) can weaken spleen qi. The five minds and seven affects are considered as "internal causes" of disease, in contradistinction to the six (environmental) excesses, which are "external causes".

In addition, there are "neutral causes" of disease, which relate to people's interaction with the environment. Overeating can cause accumulation and stagnation of food in the digestive tract, and overindulgence in rich, sweet, and fatty foods promotes damp-heat. Sexual intemperance can damage kidney qi, giving rise to seminal emission, fatigued spirit and lack of strength, and dizziness. In women, excessive childbirth can give rise to menstrual irregularities and vaginal discharge. Physical injuries can cause bleeding, bone fractures, and *blood stasis*.

Static blood is considered to be at once a pathological product and a cause of disease. Of similar status is "*phlegm*". Phlegm arises when spleen movement and transformation is impaired, and as a result, dampness arises internally, gathers, and condenses. Phlegm tends to collect in the lung. However, the phlegm spoken of in Chinese medicine is not simply sputum. Several diseases at different loci in the body may be attributed to phlegm, notably certain suppurative pathologies.

The development of disease depends on (1) the relative strength of the body's "*right qi*" (resistance) and (2) any disease evil present and on imbalance between yin and yang.

Externally contracted diseases all involve an external evil such as wind, cold, summer heat, dampness, dryness, or fire. When an external evil enters the body, it meets with the opposition of right. The ensuing fight for supremacy between these two forces is the essential characteristic of externally contracted diseases. Symptoms of aversion to cold, fever, shivering, and sweating, such as occur during the development of externally contracted diseases, are all the manifestations of the organism's fight against the invading evil. Under normal circumstances, right qi gradually gains ascendancy and the patient eventually recovers. However, under some circumstances, right is unable to withstand the attack and the patient's condition steadily deteriorates, resulting in death. Thus, the patient's fate rests on the relative strength of the two opposing forces. If right is stronger, the evil weakens and the patient will recover; if the evil is stronger and right qi weakens, the patient's condition will deteriorate.

States characterized by virulent disease evil are described as "*repletion*" (popularly referred to as "excess"). States in which an evil has abated or due to an insufficiency are called "*vacuity*" (popularly referred to "deficiency"). Repletion is typically acute; vacuity is chronic. Externally contracted heat before the more advanced stages is characterized by repletion. Diseases other than externally contracted heat disease tend to be characterized by vacuity (or vacuity−repletion complexes). A typical vacuity condition is deafness, tinnitus, impotence, lumbar pain, etc, often observed in elderly people.

In medicine, morbidity is often explained in terms of a breakdown of the mutual counterbalancing effect of yin and yang. Both evil and right qi can be analyzed in terms of yin and yang. There are both yin and yang evils. Yin evils cause a surfeit of yin, which manifests as a cold pattern; yang evils produce a surfeit of yang in the body characterized by repletion heat patterns. The "right", the body's health-maintaining force, comprises two aspects, yang qi and yin humor. Yang qi vacuity is characterized by vacuity cold patterns, whereas yin humor vacuity is characterized by

vacuity heat. A vast number of diseases can be summed up in the following four phrases: "When yin prevails, there is cold; when yang prevails, there is heat. When yang is vacuous, there is cold; when yin is vacuous, there is heat." The cause of these conditions is imbalance (surfeits or deficits) of either yin or yang. Another example of the disturbance of the mutual counterbalancing of yin and yang is liver yin and liver yang. Under normal circumstance, liver yin prevents liver yang from becoming too strong. If liver yin becomes insufficient and fails to counterbalance its complement, "*ascendant hyperactivity of liver yang*", develops.

Besides disturbance of the mutual counterbalancing effect of yin and yang is the principle of damage to one pole affecting the other. Most cases of chronic nephritis indicate yang vacuity and are characterized by water swelling (i.e., edema) due to the inability of the kidney to transform fluids. Nevertheless, when the yang vacuity reaches a certain point, fluid formation is affected and a yin vacuity pattern evolves. This demonstrates the principle of "detriment to yang affects yin". Similarly, yin vacuity, when reaching a certain peak, leads to simultaneous yang vacuity, since "without yin, yang cannot arise". What is termed high blood pressure in Western medicine usually corresponds to hyperactivity of yang caused by vacuity of yin. In severe cases, this condition may develop into a dual yin-yang vacuity, illustrating the principle that "detriment to yin affects yang".

Diagnostics. A pathological condition is determined purely on the basis of data gleaned through the naked senses. The classical diagnosis is based on the "four examinations" (*si zhen):* "*inspection*", "*listening and smelling*" (the Chinese word *wen* covers both these), "*inquiry*", and "*palpation*", i.e., on information provided by all the senses, plus the patient's own report. The palpation examination notably includes careful examination of the pulse. Numerous pathological pulses are identified, and their interpretation is complex.

Among the many pathological states of the body, there are quite a number of disease entities, i.e., conditions whose characteristics (signs, course of development) that have been recognized by physicians in China and in the West, e.g., "*chicken pox*", "*mumps*", "*cholera*", "*malaria*", "*dysentery*", "*jaundice*", "*consumption*", and "*epilepsy*". The Chinese medical definitions of these terms bear less resemblance to their definitions in modern biomedicine than to those they had prior to development of modern medicine. Cholera is a disease characterized by simultaneous vomiting and diarrhea with leg cramp, unlike the disease now strictly defined as being caused by *Vibrio cholerae*.

A large number of disease categories have no sufficiently exact correspondence in either our lay terminology or in biomedical terminology, e.g., "*impediment*" (*bi*, disease characterized by pain or less commonly numbness, corresponding to arthritis, sciatica, and other musculoskeletal diseases), "*mounting*" (*shan*, various conditions of the lower abdomen and scrotum, including inguinal hernia), and "*wilting*" (*wei*, weakness or atrophy of the limbs, corresponding to polio and other forms of atrophy). In the *E-DCM*, literal translations of disease names have been used for diseases with correspondences in biomedicine where the Chinese term reflects the Chinese medical understanding or where the corresponding biomedical name suggests a uniquely Western medical understanding; e.g., "*wind-fire eye*" (*feng huo yan*) is used instead of acute conjunctivitis.

Among its classified lists, *E-DCM* includes a large list of disease entities that can be found as entries in the main body of the dictionary.

In addition to disease entities, Chinese medicine also describes pathological conditions in terms of "patterns" (*zheng*, sometimes called syndromes in English). Many pathological conditions do not necessarily take the form of identifiable diseases. Functional imbalances and specific manifestations of diseases are recognized as symptom patterns and are treated as such. Hence the concept of "*pattern identification*" is of great importance in Chinese medicine.

In modern presentations, pattern identification is clearly structured. The most general procedure is *eight-principle pattern identification*, by which a patient's condition is classified as exterior or interior, cold or heat, vacuity or repletion, and yin or yang.

For exterior patterns, channel and network vessel pattern identification, disease-evil pattern identification, and externally contracted heat disease pattern identification provide further information.

Internal disease patterns are somewhat more varied and complex and require qi-blood pattern identification and bowel and visceral pattern identification.

In qi-blood pattern identification, one determines the presence of qi vacuity, qi stagnation, qi counterflow on the one hand, and blood vacuity, blood stasis, and blood heat on the other.

In "*bowel and visceral pattern identification*", the first step is to determine the locus. Vexation, insomnia, or palpitations appearing as principal signs indicate heart disease; cough, panting, etc., indicate lung disease. Once this is done, the relative states of yin, yang, qi, and blood can be determined with the information derived from eight-principle and qi-blood pattern identification. The heart and liver, for example, are associated with disease of all four aspects, whereas the lung is mainly susceptible to pathologies of yin and qi.

In *E-CMD*, lists of bowel and visceral disease pattern names are given under key terms such as organ names and the names of offending evils.

Medicinals. Nature and Actions. In *E-DCM* terminology, substances ingested or otherwise applied to the body are referred to as "medicinals". Although they are often referred to as "herbs", they include numerous animal and mineral products. Since they are mostly simply prepared natural items whose chemical composition is complex and variable, some object to calling them drugs.

Medicinals are considered to be cold, cool, warm, or hot in nature, depending on the degree to which they cool or warm the body. These are called the "four natures" (*si xing*) or the "four qi" (*si qi*). There is also a fifth, neutral or balanced. Since Chinese medicine is generally allopathic in nature, warm-natured medicinals such as aconite and dried ginger are used to treat cold conditions (such as cyanosis), while cold-natured medicinals such as rhubarb (*Rhei rhizoma*) are used to treat hot conditions (like constipation with high fever).

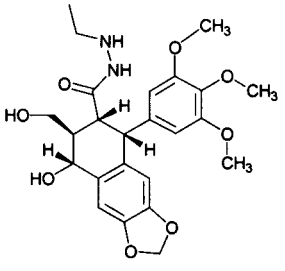
In addition, each drug is ascribed one or more of five flavors, "sour", "bitter", "sweet", "acrid", and "salty" (*suan, ku, gan, xin, xian*). These are each ascribed to the five phases

and are believed to enter (i.e., act on) the internal organ of corresponding to the same phase. In practice, however, this is not always the case, and other characteristics are often more salient. Sour agents enter the liver (wood) but more importantly have an astringent action. Bitter agents enter the heart (fire) but also have a drying and draining action. Sweet agents enter the spleen and have a supplementing and relaxing effect. Acrid medicinals enter the lung and have a dissipating and moving action. Certain acrid medicinals are used for exterior patterns. Salty medicinals enter the kidney; they can also soften hardness and acts as a laxative for dry bowels.

In addition, each medicinal is said to possess "channel entry" (*gui jing*), i.e., to enter one or more channels and their organs, and each medicinal is said to have a degree of toxicity.

Far more important are the specific actions of medicinals. A medicinal that is said to "*resolve the exterior*" treats an external contraction due to evil in the exterior of the body. One that is said to "*clear heat*" removes evil heat. Each medicinal can be ascribed more than one action; in fact, multiple actions are the norm. *E-DCM* contains a "Classified List of Medicinals" in which 655 medicinals are presented under headings that represent their principal action. The terms representing the therapeutic actions in the headings can largely be found as entries in the body of the dictionary (usually in verb-object form, such as *clearing heat*).

The database of Traditional Chinese Medicines[24] contains information on over 6500 chemicals which have been isolated from traditional Chinese medicines. The chemistry in these database is highly eclectic, and superficial review reveals many interesting questions. Podophyllotoxin (**1**), for example, is a constituent of TCMs such as Ba Jiao Lian (sixangular dysosma), Chou Bai (Savin), Gui Jiu (common dysosma), Shan He Ye (Wo Er Qu, Chinese umbrellaleaf), and Tao Er Qi (common sinopodophyllum). The effects and indication of these TCMs include anticancer and antiarthritis activity. This compound is described in western literature as a topical antiviral agent, an antimitotic, keratolytic, and antineoplastic, and a precursor to the antineoplastic agents, etoposide and teniposide. There have also been reports[25] of the utility of podophyllotoxin and its derivatives such as Proresid [Mitopodozide, (**2**)] in the treatment of rheumatoid arthritis.



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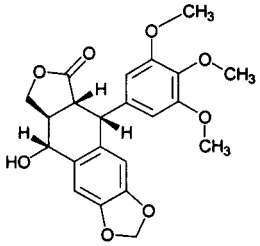

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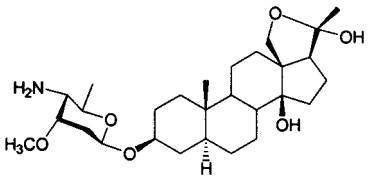
Podophyllotoxin has been well-studied in the east and the west, and it is reassuring to find that, at least in a broad sense, there is agreement on the medicinal properties of the compound. Other chemicals that play a role in traditional Chinese medicine have been studied far less or not at all in the west and could offer significant useful lead drugs. Some examples include holantosine A (**3**), reputed to be an antidiarrheal and anthelmintic agent, isomitraphyllic acid (**4**) and its glucoside, which is used in traditional Chinese medicine to treat epilepsy, and fortuneine (**5**), used to treat malignant tumors.



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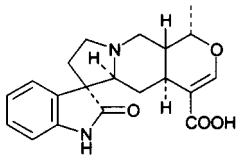

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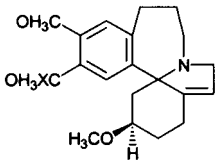

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Many of the chemicals present, possibly active principles in traditional Chinese medicines, have never been examined chemically or biochemically in the west. They are however components of plant medicines which have stood the test of time and as such may offer clues of great interest to medicinal chemists.

The *E-DCM* is principally designed for students and practitioners of traditional Chinese medicine; its English terminology reflects the Chinese concepts and the way they are expressed in Chinese. Some of the terms used have close correspondences in Western pharmacology: *worm-killing medicinals* are anthelmintics; *blood-stanching medicinals* are hemostatics (the Western terms are not used simply because they have no active verb forms, such as *kill worms* and *stanch bleeding*, that are required in Chinese medical discourse). Many Chinese pharmacological terms do not have exact correspondences. *Rectifying qi*, for example, is a method of treating *qi stagnation*, which manifests in intermittent pain of unfixed location, fullness, and distention. Qi-rectifying medicinals relieve these conditions. Generally, they are understood in modern pharmacology to have stomachic, carminative, antispasmolytic, and antiemitic properties.

Below are the main categories of Chinese pharmacological concepts with their rough Western pharmacological equivalents.[26]

Exterior-resolving medicinals: sudorific, antipyretic. Treat conditions arising when *external evils* (wind, cold, damp, etc.) invade the body's exterior surface, giving rise to chill, fever, headache, stiff neck, generalized pain, and sweating or absence of sweating (colds and flu, etc.).

Heat-clearing medicinals: antiinfammatory, antipyretic, and antibacterial effects. Treat heat conditions characterized by fever and dehydration. Heat-clearing fire-draining-drying medicinals have antiinfammatory, antibacterial, antipyretic, and calmative effects. Heat-clearing dampness-drying medicinals have antibacterial, antipyrectic, and antiinflammatory effects. Heat-clearing blood-cooling medicinals have cardiotonic, vasodilatory, antibacterial, and antipyretic effects. Heat-clearing toxin-resolving medicinals have antibacterial

and antiviral effects and treat suppurative infections and severe viral infections.

Draining precipitation medicinals: purgative, diuretic, antibacterial. Treat constipation and fluid accumulations (hydrothorax, ascites). Attacking precipitants have a powerful purgative action for constipation. Moist precipitants have a laxative action. Water-expelling medicinals have a powerful purgative and diuretic action.

Wind-damp dispelling medicinals: analgesic, antiflammatory, circulation-promoting, and antipyretic effects. Treat rheumatism (called "wind-damp" and ascribed to wind and dampness in Chinese medicine).

Aromatic dampness-transforming medicinals: Stomachic, antibacterial, diuretic. Treat "damp turbidity brewing internally" characterized by distention and oppression in the abdomen and stomach, with vomiting, thin stool, fatigue, and slimy sensation in the mouth.

Water-disinhibiting dampness-percolating medicinals: diuretic.

Interior-warming medicinals: cardiotonic, cause reflex excitation of vasomotor centers, and promote general or local blood circulation.

Qi-rectifying medicinals: stomachic, carminative, antispasmolytic, antiemitic properties. Treat qi stagnation (depressed physiologic activity) with sensations of distention, fullness, and pain of unfixed location.

Food-dispersing medicinals: stomachic, digestive.

Worm-expelling medicinals: anthelmintic.

Blood-stanching medicinals: hemostatic.

Stasis-dispelling blood-quickening medicinals:

Phlegm-transforming, cough-suppressing, panting-calming medicinals: These are mostly expectorants.

Spirit-quieting medicinals: These are calmatives. Heavy settling spirit-quieting medicinals are heavy mineral substances.

Liver-calming wind-extinguishing medicinals: These have antipyretic, calmative, and hypotensive effects. Treat ascendant liver yang stirring internal wind with pulling pain in the head, dizziness, and signs such as deviated eyes and mouth or numbness and tremor of the limbs.

Orifice-opening medicinals: These excite the central nervous system. Treat loss of consciousness, which in Chinese medicine is metaphorically explained as an "obstruction of the orifices of the heart".

Supplementing medicinals: These have numerous effects.

Astringent medicinals: These have astringent and antibacterial effects. Astringent medicinals are used to treat severe loss of fluids through excessive sweating, urination, and diarrhea.

Ejection medicinals: These are emetic.

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