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中醫藥文化

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Chinese Medicine and Culture
中医药文化（英文）

Call for Papers: Special Topic: Acupuncture Points: The Key to the Globalization of Acupuncture

With the deepening of traditional Chinese medicine's (TCM) "going global" strategy, acupuncture, a representative therapy of TCM, has been widely spread and recognized worldwide. The World Health Organization has included it in the global blueprint for traditional medicine development, and many countries have integrated it into their national healthcare systems.

As a core concept of acupuncture, *Shu Xue* (输穴 acupuncture points) has become a hotspot in Western research on TCM acupuncture. Its effects in regulating bodily functions and treating chronic diseases have drawn growing attention from Western communities. However, scientifically interpreting TCM theories and exploring a convergence path between TCM and Western medicine with *Shu Xue* as the entry point has become a common medical issue. In response, *Chinese Medicine and Culture* launches a special topic "Acupuncture Points: The Key to the Globalization of Acupuncture".

This special topic aims to build a communication platform for TCM and Western medicine, displaying research on the cultural genes and cross-cultural interpretations of core TCM acupuncture concepts. We invite global scholars to conduct research on acupuncture points in theory, clinical practice and cross-cultural communication, and contribute cutting-edge achievements to promote the international development of acupuncture.

Themes (including but not limited to)

1. Scientific and cultural background of the discovery of acupuncture points;
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3. Exploration of the origin and evolution of the English translation of the term " 输 穴 " (There are multiple English translation versions for " 输穴 ", such as acupuncture loci, acupuncture points, acupoints, etc.);
4. Research on acupuncture points charts and acupuncture bronze figures at home and abroad;
5. Review and prospect of anatomical studies on the structure of acupuncture points at home and abroad.

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Chinese Medicine and Culture is an interdisciplinary academic journal focusing on the study of Chinese medicine. It aims to promote communication and dialogue between researchers in the natural sciences and humanities of Chinese medicine. The objectives are to build an interactive platform for interdisciplinary research on Chinese medicine and to comprehensively reflect the high-level and latest research results of Chinese medicine in the fields of medical science research, cultural exchange and historical heritage conservation.

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Feature Article

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OPEN

Overarching Three Yin-Three Yang: Evolution of the Basics

Edwin C.L. Yu (余秋良)[1,2,3,✉]

Abstract

The three yin-three yang (三阴三阳, 3Y-3Y) system in traditional Chinese medicine (TCM) represents a distinct evolution from the earlier yin-yang (阴阳) theory that had astronomical applications. This system was used specifically for the body channels. One needs to unveil the missing elements of its early evolution, as the understanding of how the 3Y-3Y system was derived prior to the observation-based 11 meridians remains unclear. By integrating historical and archaeological sources and using an interdisciplinary approach that links cosmology, body movements, and meridian development, the missing conceptual elements can be retraced. Early observation-based body mechanics and movements were viewed through the yin-yang framework. The initial culture focused on a "tripodal system" of yang movements in the lower body, which is evidenced by the more primitive Shuangbaoshan (双包山) figurine that depicts three yang lines on the legs but lacks yin lines. The earliest texts, such as *Zu Bi Shi Yi Mai Jiu Jing* (《足臂十一脉灸经》*Moxibustion Canon of Leg and Arm Eleven-channels*), also prioritized the limbs, suggesting body movement was probably the primary derivative. The three yang lines were likely named based on the body parts that received the most sunlight. As yin encompasses a broader range of concepts, the setting of the three yin meridians was more complex and developed somewhat later. For a time, the meridian system was not fully correlated with the internal organs, and early models—even the Shuangbaoshan figurine—were missing the legs' yin lines entirely. It is proposed that the lateral yang line and the Jueyin (厥阴) line together could have been more meaningful. Understanding the incremental progress—from cosmological yin-yang, to understanding the body in yin-yang, to body movements in yin-yang, to body tripodal yin-yang, and then to the transitory 2Y-3Y+3Y-3Y upper plus lower meridians—is significant for TCM history. This progression culminated in the conceptual leap to a complete 3Y-3Y system, a development that created a balanced model that harmonizes the body with the cosmos yin-yang cycles.

Keywords: Three yin-three yang system; Yin-yang; Meridian; Body movements; Unearthed medical relics; Traditional Chinese medicine

1 Introduction

1.1 Pre-Han technical and methodological foundations for TCM development

Since 5,000 years ago, China passed through a series of sage emperors from Huangdi (黄帝) to legendary rulers of Yao, Shun, and Yu the Great (尧、舜、大禹). Their wisdom and contributions to society were supported by sage ministers who led rituals and devised scrutinous explorations and observations of the sky and earth. Knowledge built up through the inquisitional system for multi-dimensional explorations in ancient China emphasized measures and verifications.[1] *Yao Dian* (《尧典》*The Canon of Yao*) described the meticulous study over the four directions of the entire domain.[2] After the Xia, Shang, and Zhou dynasties, consolidated knowledge became diversified over the Axial Age of Chinese philosophy in the Spring and Autumn Period and Warring States Period.

Nevertheless, much of traditional Chinese medicine (TCM) that was passed down to current times was confined after the Han dynasty. The breadth of TCM theories was narrowed down through cultural processes. The tomb excavation of ancient figurines and documents has re-excited renewal in understanding in TCM. Teams of scholars are trying to revive the formative gist of classical medicine in TCM.[3] The pre-Han periods warrant more understanding, as technological, mathematical and, methodological developments were already sophisticated. Yet, in those eras after the Han dynasty, the confined configuration of understanding coupled with the

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loss of ancient texts has left current TCM scholars with an innate need to reform the basics of what are to be taught and practiced.

1.2 Lost elements in the three yin-three yang (三阴三阳) system: the chasm between classical yin-yang and meridian specificity

The yin-yang (阴阳) system has been well developed since ancient days in China, in close relation to the understanding of sky and earth phenomena. Various features of the yin-yang system could have been derived through aggregated measurements and long-term observations.[1] Early Chinese astronomy consisted of exhaustive documentation of the natural world and observable universe.[4] The development of the unique knowledge system in ancient China brought about a classical model to chart earthly and astronomical events with which the course of climatic and weather changes over the years could be effectively predicted for living through the centuries.

Nevertheless, the classical yin-yang system, while enchanting with splendor, may not simply be able to depict the complexity of the body. The devise of a three yin-three yang (三阴三阳, 3Y-3Y) system described in *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*), quite different from the classical system, endowed medical approaches with a powerful body management system, powerful due to its synchronous concordance of body states with climate changes and cycles.

In due course, since this ancient establishment of the 3Y-3Y system, there have been a lot of retrograde re-justifications of the 3Y-3Y system by theories and derivations from the classical system that later on became more sophisticated. However sophisticated the 3Y-3Y system derived from classical yin-yang theorists may be, it does not seem to be able to cover the full accord offered by the original 3Y-3Y system,[5] especially when put in the context of all the body features and changes in relation to the weather changes. There should still be missing parts in the derived-3Y-3Y system that it cannot match fully.

The original 3Y-3Y system was established before the whole series of sophistications of classical yin-yang system that were borne out in later dynasties. While many may believe that the derived-3Y-3Y system and the original one both tally, this should still be doubted since *Huang Di Nei Jing*, after classifying the body with classical yin-yang dichotomies in chapter 4,[6] almost immediately stated directly that multiples in scalability of yin-yang dichotomies would not be good enough to describe body complexity as one.[7] Furthermore, it is also odd that the 3Y-3Y system, which embraces the concordance between the body and the weather changes, has never been mentioned in the classical yin-yang system all along, nor in the weather-astronomical system of ancient China that was handed down. At those ancient time before *Huang Di Nei Jing*, there must have been other missing elements before the derivations of the 3Y-3Y system that contributed to their different course of theorisation and development.

Regardless of views whether the classical yin-yang system can fully embrace the 3Y-3Y system, more work towards rediscovery of the original 3Y-3Y system should be needed, particularly for missing elements. The evolution of the meridian system from 11 to 12 channels is a pivotal development in the history of TCM. This transition reflected a shift from early, observation-based concepts to a more systematized and theoretical framework. This paper tries to retrace fundamental emerging elements that led to the original development of the 3Y-3Y system. To enlighten readers interested in TCM, the next section offers some preliminary basics, followed by the sections on the main discourse.

2 The common cognitive and practical approach prior to yin-yang system

In ancient times, understanding of the world around ancient people was viewed under the yin-yang system with cumulative success, coupled with gauging through measurements of earthly and astronomical phenomena.[1] For the body in the same breadth, visual and tactile explorations for localization of pain and problems in body parts and manipulation of the body for its various needs in relieving pain and treating diseases initiated necessary observations and solutions.

Yin-yang and astronomical understanding were prevalent among people in those days, so well understood that ordinary people familiar with those principles made quotable statements that were good enough to be passed down: "In times of the three ancient Xia, Shang and Zhou dynasties, everyone knew about astronomy (三代以上，人人皆知天文)".[8] The importance of astronomical principles, likened to physics nowadays, was pervasive over all disciplines, and during the Qin dynasty and Spring and Autumn Period, medicine was inseparable from astronomy. Even a founding chapter of *Huang Di Nei Jing*, one of the earliest medical treatises, started by stating "Yin-yang, the way of heaven and earth (阴阳者，天地之道也)".[9] Human tie to the surrounding world is well stressed. The idea is to develop a unified theoretical view of everything.

Anatomical knowledge was certainly present in primitive days in China, since oracle bone inscriptions (甲骨文) recorded human anatomical features like head, face, nose, ears, mouth, tongue, teeth, neck, abdomen, breasts, shoulders, arms, elbows, hands, fingers, hips, knees, legs, toes, and feet, as well as external tissues like beards, mustaches, sideburns, and hair, as well as the internal structures like hearts, bones, blood, and spines.[10] Rediscovered ancient books at Mawangdui (马王堆) Tomb also mentioned the names of viscera.[11]

At this time, assessment through measurements would be well looked for. Founding heroes, Fu Xi (伏羲) and Nyu Wa (女娲), were often depicted as holding gauges.[12,13] The ancient Chinese would use two-dimensional elements in their analysis, and integrate the whole into a multi-dimensional framework when expressively deliberating on the pertinent theme.[1] The body dimensions were well recorded and measured. *Huang Di Nei Jing*, for the body, expounded on the meaning of measurement: "It is beyond human capacity to measure the height of the sky or the breadth of the earth". Nevertheless, for a human being who is 8 feet tall, it would be easy to obtain measurements of skin and flesh from the surface, while after death a human body could be dissected to get a general idea of the firmness, the size and the capacity of his viscera, to measure the length and extent of his blood vessels, and to evaluate the quality of blood and the quantity of qi as well as the proportion of blood and qi in the twelve meridians".[14]

Further equivalents were drawn between the sky-earth and the human body, with phenomenal equivalents used for quantification. The four limbs of the body were regarded as counterparts of the four seasons of the world. The body with 365 segments was viewed as a counterpart of a year having 365 days. Analogously viewed, while the land has hills, the body has shoulders; while the land has deep valleys, the body has armpits. The zest to associate the body-astronomical tie, sometimes magnified, can be seen in *Wu Ji* (《五纪》*The Five Ages*), the tomb-recovered bamboo manuscript, which stated, "the human body dimensions were integrated with mathematics to establish scales, and furthermore, each limb segment and body part is associated with heavenly rulers, and each is correspondingly associated with the twelve astronomical divisions (将人体与数算结合，进行尺度的建立……人体各部位的神司及其与六旬、十二辰的配应关系)".[15]

The idea of world-body connection was found in all eras around the world, and specific body issues were to be viewed as related to the environment around or above. Not unexpectedly, *Huang Di Nei Jing* viewed the world-body connection in the same way as the then current system of understanding: "The world consists of yin and yang, and humans consists of twelve meridians; the expanse of the world comprise both cold and heat, and the expanse of man comprises both deficiency and excess(天有阴阳，人有十二节；天有寒暑，人有虚实)".[16] Understanding of how the 3Y-3Y system was derived through observations was yet to be uncovered.

3 The evolution of functional anatomy cognition in ancient China

Retracing fundamental emerging elements should start by understanding the culture at that time, with body movements viewed in yin-yang, and with the realization that yang movements were anchored through the ancient tripodal system.

3.1 Foundational construction of bodily knowledge: yin-yang and sky-earth context

Early ancient people did much exploratory localization and manipulation of the body for pain and other problems. Their observations must have been handed down with a whole series of terms. It was common to refer to body parts by their similitude in experience or equivalence to natural matters. Terms were used to denote body turns, hubs, vacancies, prominences as being like lakes, valleys, and hills. They also depicted internal channels and their blockages analogous to water channels, rivers and their blockages and floods on the earth.[17]

Knowledge of the body through dissection was probably not lacking in ancient China.[18] Yet, anatomy would be of little meaning when compared to the conglomerated way of knowledge developed in the classical yin-yang system and the weather-astronomical system. Knowledge of the body localities without a synchronous concordance of body parts with the changes and cycles of sky and earth climatic states would provide an inadequate understanding under those ancient standards. Similarly, simply categorizing the human or animal body as yang facing up above and yin as facing down below and in other dichotomies of yin-yang was not adequate. The whole should be intercorrelated integrally and functionally.

The success of the ancient sages could never have been achieved with just one hypothesis or experiment. It emerged from countless explorations, observations, verifications, repeated use, eliminations, and even after countless failures. After that, the ancient people finally found the pictorial sky-earth understanding and the associated body phenology up to response points and lines that could meet the requisite model as the insightful characteristics of TCM. The progress of understanding of body-world concordance in a multidimensional entirety necessitated analytical equivalence classification[1] to empirically arrive at the right approach. The complexity could include sorting through controversial collections of thoughts, observations, and concepts. To build this knowledge, there would at least be two lines of development in those times: one line from understanding body movements and another from observations during body manipulations.

3.2 Development of body understanding from body movements and manipulations

3.2.1 Body movements and the yin-yang correlations in tripodal system

While the body stretches and moves in action and activities, with muscles and ligaments aligned for each direction, the whole body needs balance for control. Active motions with power in one or two hands and arms necessitate reciprocal leg support from below. As yang

means vigor (活力) and yin means endurance capacity (耐应支撑力), when assertional motion is one-sided, the arm pushing with the head-lift acts and is categorically yang. The reciprocal leg movement on the other side also pushes externally for active strength, also categorically yang (Fig. 1). The firm support from underneath comes from the inner side of the two legs, categorically yin, up the body core, whose mass gravitates down the center. While modern medicine views it with antagonist muscles acting locally around a joint, ancient Chinese would view coupled pairs in yin yang synergized at the whole body. Movement generalization was useful, since after all, movements intrinsically were related to the texture of the body and its fascial system including response points and lines.

Meanwhile, one important development of understanding in mechanical utility is evident with the tripods. The *Ding* (鼎 tripod) (Fig. 2) was a highly significant construction in a country or kingdom, and massive copper reserves and funds had to be used. *Ding* vessels were ancient Chinese cauldrons. Two-legged vessels could not stand, while four-legged ones often unstably wobbled over most surfaces. The use of three legs could be highly stable (as it sets itself on its 3-point-plane on any not so even ground). For centuries, the three-legged *Ding* had been symbolic of strong stability. In the Zhou dynasty, the *Ding* and the privilege to perform the associated rituals were symbols of authority.[19] The power of this tripodal stability was impressive, and ancient practitioners should have rightly transposed this prevailing knowledge to understand the mechanism of the body.



Figure 1 Arm active motion (right arm illustrated here) out with power (yang) supported by reciprocal leg-action (left) pushing down below (yang) and head-lift in acting out (yang). The inner sides of the two legs offer firm support from underneath (yin), while the body core gravitates down the center (source with permission from: picture made by the author)



Figure 2 Tripod symbolic of strong stability. The *Da Yu Ding* (大盂鼎) and *Mao Gong Ding* (毛公鼎), as treasures from the Western Zhou dynasty, illustrate the core mechanical system in general and in relevance to body stability (source with permission from: https://en.m.wikipedia.org/wiki/File:Da_Yu_ding; https://zh.wikipedia.org/毛公鼎)

The relevance of cultural focus on the tripodal system for yang movements in the lower body was evidenced by the more primitive Shuangbaoshan (双包山) figurine, which depicted three yang lines on the legs, but lacked yin lines. Besides, the earliest texts such as *Zu Bi Shi Yi Mai Jiu Jing* (《足臂十一脉灸经》*Moxibustion Canon of Leg and Arm Eleven-channels*) also prioritized the limbs (with the "leg and arm" emphasized), suggesting body movements was a primary concern and influenced the development of response-line derivatives.

3.2.2 Body manipulations and observations of response points and lines

The other line of development started from observations during body manipulations. It is well recognized that in very ancient days of China, traditional medicine developed through body manipulations for relieving pain and treating diseases.[20] The repertoire was not recorded in written form because writing was difficult, so that it was only transmitted through sketchy records. According to the story of Bian Que (扁鹊), an expert physician of the Warring States period, who treated the critically ill prince of the State of Guo (虢国), the concubine's son mentioned that Yu Fu (俞跗) from remote antiquity could successfully treat illnesses without herbs, using heat therapy and stone massage through manipulating specific body parts (一拨见病之应).[21] In a way, observable body changes through external manipulations dated back to a very early period. This could have contributed to later recognition of body response lines as they resulted in good responses.[22]

The above exploratory localization through body manipulation must have been passed down from various sources a great number of terms. One concept of acupoints was defined in *Ling Shu Bei Shu* [《灵枢·背俞》*The Spiritual Pivot: The Transport (Openings) on the Back*]: "If pain relief inside when the finger applies pressure at the locality, that is the *Shu* point (按其处，应在中而痛解，乃其腧也)".[23] For this matter, there would be lots of controversial names given to the body parts, pertinent but not yet widely recognized as meaningful. Names like *Qiu Ling* (丘陵 dunes), e.g. *Qiu Xu* (丘墟 Dune Hub), *Shang Qiu* (商丘 Shang's Dune), *Liang Qiu* (梁丘 Leung's Dune), as well as *Hu Hai* (湖海 lakes and seas), e.g. *Xue Hai* (血海 sea of blood), *Qi Hai* (气海 sea of qi), *Xiao Hai* (小海 Miniature Sea), and anatomical terms to name body parts, as well as many lost names not known presently, might have been inspired by associating the

body with rivers and lakes of nature (equating body parts with natural phenomena).

Meridians were depicted in ancient China. To date, the earliest lines noted were depicted in wooden figurines that were treasured by their owners for years before being escorted or placed in burial tombs at around 2nd century BCE.[24] Some reviews of the 10 meridians etched on the lacquer figurines unearthed from the Han dynasty tomb in Shuangbaoshan (双包山), Sichuan, China in 1993[25] suggested that sensory response lines were being recorded.[26]

Besides movements and sensory responses, observations of the response of patients with external or internal pains and ailments subjected to manipulation of the points or lines were likewise noted. Indeed, some archaeological findings of acupuncture needles and traces of herbal treatments suggest that they dated back 4,000 to 8,000 years.[27,28]

In those stages of exploration and development, the points might have been found *ad hoc*,[29] or the lines of response or channels gradually emerged as clear meridians with the lines recognized first[30,31] and with the lines appreciated after points recognized,[32–35] or the two mutually supporting each other in the direction of exploration and thus being developed.[36–39] Through all these basic body observations and understandings, their meaning in terms of various body layers, body dynamics and reactions, dysfunctional reactions and pathologies, as well as particular patterns were progressively appreciated.

4 Advancing body mapping under yin-yang and sky-earth frameworks

With the conceptual multi-dimensional frame of yin-yang prevalent, localities would of course have been also denoted with yin-yang accordingly. Sites up to the limbs, such as *Yin Ling Quan* (SP9 阴陵泉 yin mound-spring) on the inner side of the calf, and *Yang Ling Quan* (GB34 阳陵泉 yang mound-spring) on the external side of the calf. Similarly, the body's hollows had *Yin Gu* (KI10 阴谷 yin valley) and *Yang Gu* (SI5 阳谷 yang valley), and they were similarly named.

All these understandings of the body were inadequate unless they could be viewed in terms of the prevalent worldview, the wholesome sky-earth yin-yang concepts in those times. As the lines and points were discovered, each of them could have been clarified along such dimensions. Moreover, interpretations of the totality of body reactions to the environmental changes, including heat, cold and various climatic changes would have been considered.

4.1 Core tenets of yin-yang bodily mapping: deductions from celestial and terrestrial phenomena

Mapping the body under the yin-yang framework needed to concur with fundamental precepts. Since ancient times, the sky-earth concepts around yin-yang denotations had evolved from their basic derivations (Table 1, Table 2), and these concepts subsequently expanded as they were applied to more areas.[1]

Body lines and body observations had to be expressed in terms of the totality of sky-earth concepts. To view them, further applications and similar redefinition along the above derivational process could bring out their apt yin-yang denotations. Yin-yang denotations over body movements would be further developed over two stages. As described, the primary derivational coding of the body would be along yang movements as being assertional or yin movements as support. Yin represents passive forces while yang represents active forces. Further secondary derivation over the body yin-yang[6] would be made according to external and internal heat or energy flux/movement that could be coded (Table 3), even reflected against the yang heat of the sun.

4.2 Numerological coding of bodily complexity: the cosmic logic of "5+6" in Chinese philosophy

People may find it odd as to why the yin-yang dichotomy needs to have further derived subcategories to cater for the body. In fact, the body is too complex for simple application of the yin-yang dichotomy (Table 3). To elaborate, while the back of the body including the neck, shoulders, back, and the outer parts of the arms and legs is yang, the front of the body including the face, chest,

Table 1 Yang and yin in sky phenomena, earthly matters and civilized definitions, as the primary derivational framework

Sky Phenomena	Earthly Matters	Civilized Definitions
天 Sky	早; 夜 Sun; moon Day; night	天地之本 The foundation of heaven and earth
地 Earth	阳…出气; 阴…出云 Yang… qi; Yin…clouds	阳阴运化 Yin-yang formations
人 Human	山之南，水之北; 山之北，水之南 Mount S/River N sunshine; Mount N/River S shadowy (S=South, N=North)	人释义定 Human definitions

Table 2 Yang and yin concepts secondarily applied on each entity or matter

Sky Phenomena	Earthly Matters	Civilized Definitions
天 Sky	干; 坤 (太阳)日; 月(太阴) Heaven; Earth (Taiyang) Sun: Moon (Taiyin)	天地之本 The foundation of heaven and earth
地 Earth	阳…健、刚; 阴…顺、柔 Yang: energetic; Yin: compliant Yang: rigid; Yin: soft	阳阴运化 Yin-yang formations
人 Human	阳台; 树阴 Yang: sunny terrace; Yin: shadowy below trees	人释义定 Human definitions

Table 3 Application of yin and yang over body and parts along Sun heat perspective

Sky Phenomena	Earthly Matters	Civilized Definitions
天 Sky	(阳)日; 地(阴) (Yang) Sun: Earth (Yin)	天地之本 The foundation of heaven and earth
地类比 Earthly analogy	阳…外, 上; 阴…内, 下 Yang: upper sky; Yin: lower earth Yang: exterior; Yin: interior	阳阴运化 Yin-yang formations
人 Human	日照: 上身, 肢体外, 俯; 日影: 下身, 肢体内, 仰 Yang: facing sun; Yin: shady areas Yang: upper body, limb exterior, back; Yin: lower body, limb interior, front	人释义定 Human definitions

abdomen, and inner parts of the legs and arms is yin. Paradoxically, however, the upper back is yang and the lower back is yin. The chest is yang and the abdomen is yin. *Huang Di Nei Jing* in chapter 4 described some basic body categorizations,[6] but further on, as ancient wisdom did not accept the simplistic view that yin is merely yin and yang is merely yang, the overlaps could be viewed as poorly defined.

It might be even more confusing for modern people to understand how the yin-yang dichotomy evolved into the three or six dimensions that qualified the medical scene (quite different from the astronomical scenarios). To retrace its derivational evolution, the cultural changes of and emphases on 3 and 6 in those times should be recognized. It should be noted that the 3-legged tripodal *Ding* was widely used in the Shang and Zhou dynasties, and sky-earth mathematical concepts all emphasized 3 and 6. *San Gong* (三公 three ducal ministers) since the Zhou dynasty has been valued as the highest central governing institution in the ancient kingdoms.[40] Lao Zi (老子) in the Spring and Autumn period also emphasized "Dao begot one, two begot three, and three begot myriads of things (道生一，一生二，二生三，三生万物)".[41] Similarly, *San Qing* (三清 Three Pure Ones) were taken as the three highest deities in the Daoist pantheon.[42] The literature of those times stated "the number for heaven–six, and for earth–five, are mathematically constant (天六地五，数之常也)",[43] while another quote conversely stated "heaven has five as its number; earth has six as its number (天数五，地数六)".[44] The differences in the representations of 5 and 6 arose variously from *Luo Shu* (《洛书》*The Book of Luo*) and *He Tu* (《河图》*The River Chart*). In *He Tu*, whose numerical essence is about generation and innate qualities, 5 is the quintessential number at the center of generation. Therein, even numbers meant completed generation. Six was the first number after 5, and thus the perfection of yin represents earth. In fact, 5 has long been closely associated with *Wu Xing* (五行 five elements) as well as with *He Tu*. Subsequently, the strength of 3 as a symbol of strong connection and support remained as a legacy down to the Han dynasty as *Shi Ji* (《史记》*Records of the Grand Historian*) described, "The numbers begin at one, end at ten, and are established at three (数始于一，终于十，成于三)".[45] It lasted even for later counties down to the post-Han Three Kingdoms,[46,47] re-emphasizing the number 3. Notably, 3 and 6 are necessary root numbers for the 360 or 365.25 days and 12 months of the year, and they are important in relating phenomena to sky-earth constructs.

4.3 Hexagonal-tripodal body structure and adaptive movement mechanisms

Observations over dissections, not uncommon over those years,[18] could have disclosed how the vertebrae were shaped[48] to produce hexagonal-directional movements in a body with mouldability (Fig. 3). Having 3 on the right side and 3 on the left side strengthened the verification of 6 for the number for earthly matters (地数六).

After all these considerations on movement for its yin-yang aspects, the ancient Chinese finally produced models of lines and points to substantiate their usage. It may be remarked simply that, depending on the context, the numbers 5 and 6 together form a comprehensive configuration: whether it is heaven–six, and earth–five for numbering, or the converse, five for meeting up heavens and six for earthly anchorage.

The discovery through the unearthing of new medical figurines demonstrated this 5+6 totality configuration. This presented an opportunity for critical review of classical medicine for TCM that has been passed down. The Shuangbaoshan figurine excavated in 1993 and that in Laoguanshan (老官山) in 2012 are believed to represent accumulated knowledge from the Spring and Autumn

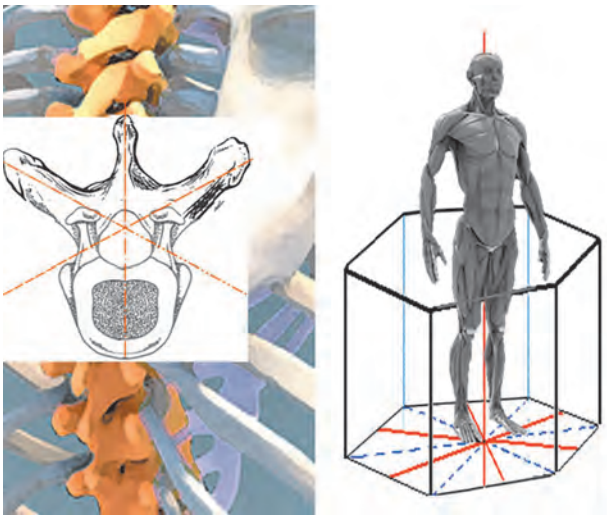


Figure 3 Hexagonal-directional movements in a body with mouldability (source with permission from: Mouldability of the body core in adaptive form[48])

or Warring States periods. These were complimented by the discovery of tombs containing *Zu Bi Shi Yi Mai Jiu Jing* and *Yin Yang Shi Yi Mai Jiu Jing* (《阴阳十一脉灸经》 *The Moxibustion Canon of Yin-yang Eleven-channels*), both confirming the earlier emphasis on 6 yin-yang lines in the lower limbs and 5 lines in the upper limbs.[49] The stability for the lower frame for standing aligned with the tripodal stability. Apart from stability, trinary topology can enhance decision-making and problem-solving processes.[50]

5 Constructing yin-yang mapping for body maneuvering and dynamic balance

5.1 Yang aspects: tripodal yang lines defined by sunlight exposure

To set the tripodal yang lines on the lower limbs [Yang 1 (Taiyang), Yang 2 (Yangming), and Yang 3 (Shaoyang)], defining their yang attributes was easier with reference to sunlight on the body. Observations were clear that, apart from the back, which is exposed to sunlight and thus designated as a yang surface, the human chest and belly notably also face sunlight, while the lateral flanks less so (Fig. 4). Thus, Yang 1 on the back is greater yang, and the belly as well as the lap Yang 2. The lateral sides of the trunk, which receive less consistent sunlight, would be lesser yang (Fig. 4). Conforming to observations, these designations worked out well for a tripodal stand as a yang configuration down the lower body.

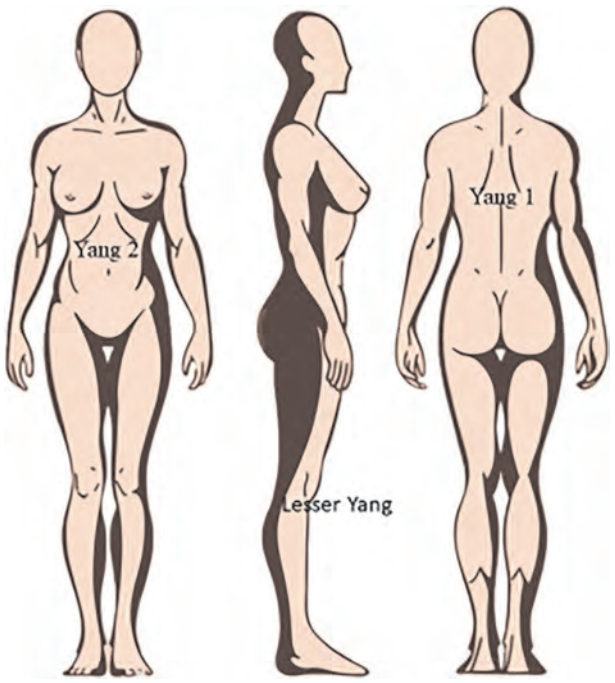


Figure 4 Considering Yang configuration with sunlit body surfaces Taiyang, Yangming and Shaoyang. Yang 1, Taiyang: upper and posterior facing sun; Yang 2, Yangming: belly and lap sunlit; Lesser yang, Shaoyang: lateral in wavering sunlit (source with permission from: picture made by the author)

5.2 Yin aspects: complex derivation of tripodal yin meridians

For the tripodal lines on the yin support side, derivation was more complicated. In fact, historically, there was an interim period of uncertainty in resolving this issue, since in *Zu Bi Shi Yi Mai Jiu Jing*, the yin meridians had not yet been fully correlated with the five internal organs, and the presentation was relatively less sophisticated. Moreover, in the earliest Shuangbaoshan figurine, the yin lines over the legs were totally missing. Determining the yin aspects of body configuration could have been more complicated, since yin could signify many entities and concepts, whether those designated yin in the sky and on earth, including the moon, the shades, or matters under the earth, and those under the same derivational principles, those entities of support of many kinds, and many entities internally situated in the body endowed with yin properties.

Settling the yin lines over the upper limbs probably could have been easier, configuring to accord with the expected 5 lines (3 yangs and 2 yins) over the upper body. Setting the tripodal yin lines on the lower limbs (Yin 1, Yin 2, and Yin 3) probably would need justification particularly for the third extra Yin 3 line for what it meant in the bigger perspective. The other two yin lines that ground the body could be simply configured as lines for mechanical support and nourishment (Fig. 5). Let these two be so called for the time being transitorily, the "Major Yin" and the "Deep Yin", and the third being undecided with reserved support be so called "That Participatory Yin", pending further verification (these names put here for a transitory interim, duly

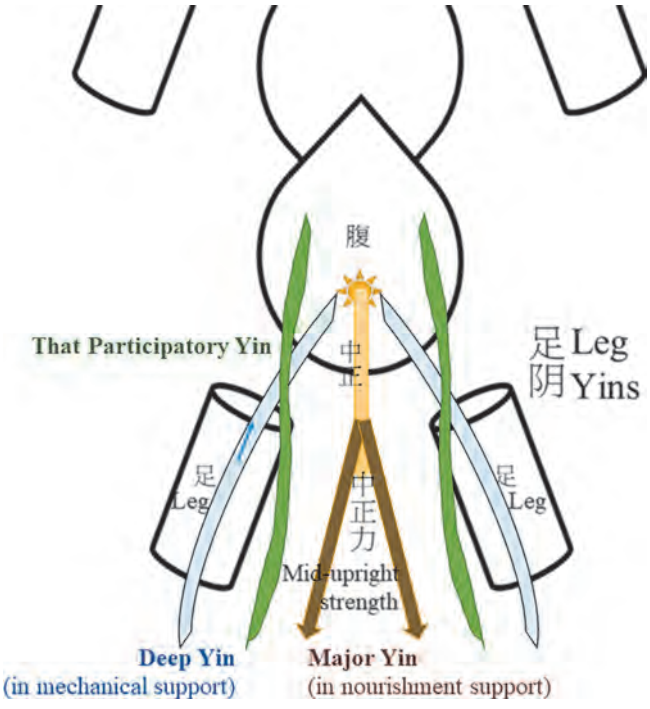


Figure 5 Yin support along 3Y-3Y properties: Tripodal Yins as "Deep Yin" (in mechanical support), "Major Yin" (in nourishment support), and "That Participatory Yin" (transitory naming) (source with permission from: picture made by the author)

elaborated further with understanding conglomerated concordance with the sky-earth continuum in the subsequent paper). These yin and yang derivatives as categorized configurations were presented (Table 4).

5.3 Understandable controversies in the interim meridian mapping: across multifarious reference frameworks

When referencing along movements can be well affirmed, the tracing of lines along them should affirm the finalization in placement of lines. Yet it is evident from the present collection of unearthed figurines and orthodox acupuncture mapping, that the "placement" of lines is relatively similar but not always uniformly the same. It might be said that before establishing the lines, there should be controversies, probably only covered up when current academics try to make out evidence for their own theorization.

Descriptions of meridians might not be unified: controversies might not be easily settled as considerations could have been referencing along tendomuscular fascia,[51–54] or movement-related (as expounded above) and another considered referencing to yin-yang system,[55] along with nature,[56] or another along sensory responses (whether true or not true).[26,57,58] Still others referred them along perfusion of blood vessels,[59–62] or, according to that perceived by practitioners during *Qi Qong* (气功 qi therapy) exercise or therapies.[56] In due course, meridial line referencing got better as the the lateral yang line and that participatory yin line were contrasted together with the assumption that they are more meaningful whereby the *Jue* line could be established.

Table 4 Tripodal tertiary derivations: yin and yang along movement-support yang vigor and yin resilience support viewed along 3Y-3Y properties

Sky-earth Phenomena	Earthly Matters	Medicalized Definitions
天 Sky	(阳)日, 干; 地, 坤(阴) (Yang) Sun; Earth (Yin)	天地之本 The foundation of heaven and earth
地类比 Earthly analogy	阳: 活力; 阴: 耐应支撑力 巨阳1-面向太阳，背部; 主阴1-机动力撑持; 次阳-暗向太阳，侧面; 深阴2-甘营力支持 Yang: vigour; Yin: resilient support Greater Yang 1-sun facing, back; Major Yin 1-in mechanical support Yang lesser-sun shaded, lateral; Deep Yin 2-in nourishment support	阳阴运化 Yin-yang formations
人 Human	阳: 指令; 阴: 容许 复阳2-太阳复照，腹面; "悬置阴": 待决供持 Yang: directive; Yin: allowing Lap Yang 2-sun lit, front; "That Participatory Yin 3": reserved support	人释义定 Human definitions

6 Coupling of yin-yang lines for body maneuvering and regulation

6.1 Settling yang lines under body movement-related considerations

Despite controversies which might have been there, the former foundations and the use of tripodal lines at the lower end of the body could have brought out the number and positioning of the lines more convincingly and firmly set for the lower body. As an essential mechanical stronghold, the tripodal lines set, in particular, the lower yang lines. Further observations could arise through looking for response points along these established body lines as well as extrapolation of lines as those stemming from them up the upper body. It would also hold that yang to represent the functional energetic qualities while yin to represent the structural and substantiating qualities.

The earliest descriptions in the documents, *Zu Bi Shi Yi Mai Jiu Jing*[63] with meridians named for "arm" and "leg" should represent the older legacy of referencing related to movements. *Zu Bi Shi Yi Mai Jiu Jing* referred to the legs and arms without points, following movement aspects in the legs and arms. The upper body meridians were still constituted with 3 yang lines on the outer side of each arm and 2 yin lines on the inner side, to come up with a total of 5 as requisite according to the heaven-related 5 for upper numbers. The body knowledge in any case would be correlated with movements functionally. By this time, further understanding must have emerged further with understanding of hexagonal directional movements.

In a body with mouldability,[48] noting how the body involved spiral movements at the body core (Fig. 6) would particularly induce perception of lines that comply and allow for these spiral spine central movements. On the lateral flanks of the body, the zigzag line would

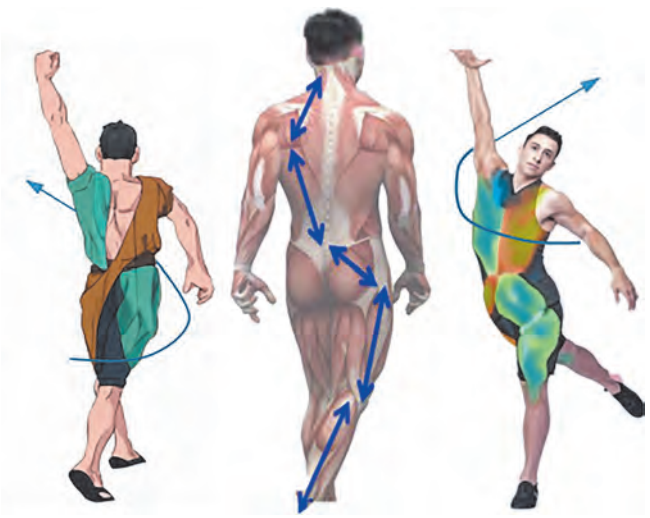


Figure 6 Functional anatomy. Spiral core movement induces complying lines manifested (source with permission from: picture made by the author)

be reckoned, relating it first to the twist when body core moves forward separately over one side pushing against the costal skeleton of that side. Yet conversely the same body part in the next moment, over to the other side, pulls away from the former costal skeleton at a very different angle. The two directives over the lateral flank form a line from the two planes of movement at an acute angle (Fig. 7). This line, the "lateral yang line", situated at lesser yang area, is shaped in orthodox TCM and named currently as the gall-bladder meridian.

6.2 Settling yin lines under body movement-related and support considerations

Ancient Chinese sages well versed with sky-earth philosophy would comprehensively identify yin or yang and thus consolidated the matters into a yin-yang related system.[1] With lower yin lines (meridians) set as "Deep yin" (in mechanical support) and "Major yin" (in nourishment support), what meaning of the last undecided one "that participatory yin 3" in the tripodal configuration (Fig. 5) would be well worth reconsideration.

6.2.1 Coupling "that participatory yin" line with the "lateral yang line"

Similar to the zigzag lateral yang line, there was another somewhat zigzag line in the yin aspect. In fact, besides the yin lines for mechanical support and nourishment support, there should be another yin line to support allowance of changes during yang movements and actuation. This line, on the interior side, should support the angular direction of turning and moving. This interior yin line (currently named the Liver meridian) can be understood by its configuration, with which pliable line bending at the groin and knee would deem fit for allowance in determining all sorts of directions in movements (Fig. 8). With inclination-vs-angulation made through the lumbar spine and hips, the use of "that participatory yin" line could functionally help discretional support for steering the changes in direction in many activities by molding a different course of body disposition—as if decisional.

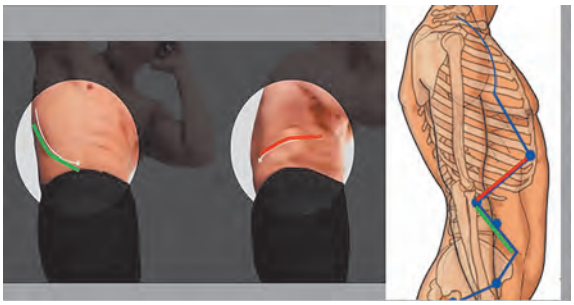


Figure 7 Lateral yang line based on functional anatomy. Zigzag line formation at lateral flank after repeated sideway turns over two directions (source with permission from: picture made by the author)

Action wise, the zigzag lateral yang line on the external side described earlier for its movement related domain, may be understood to actualize the needed directional changes in all kinds of motion. Complimentarily, "that participatory yin line", offering discretional support, would allow in determining direction and course of movements. The two lines, yang motional twisting in configuration, and yin supportive twistable, could be well paired when viewed in terms of "change".

In due course, observant ancient sages would determine that this interior yin would support determination or discretion (决定), to support what the yang externally need be actionable. Worthy to note, the word *Jue* (决), a word for action, in ancient days might mean "clearing matters up to channels (排除阻塞物，疏通水道)"[64] and was later extrapolated to discretional decision.[65] Its meaning "to breach through and imbue the channel (决水而灌之)"[66] is equivalent to the concept of channel formations that significantly influenced ancient development of TCM.[17] Yet "that participatory yin" line could support determination or discretion. It was later formally named under Jueyin (厥阴). Interestingly, *Jue* used in the yang *Jue* (决) and the yin *Jue* (厥) might be more than coincidental.



Figure 8 Functional anatomy illustrated for meeting "change". The current orthodox Liver line configuration is shown in A. The "discretion support Yin line" support allowance in determining direction of movements, at least over movement aspects. To achieve dynamic balance, while discretion for Inclination vs Angulation is done with lumbar spine and hips, the use of this Yin meridian line steers the changes in direction in many activities, exemplified as best illustrated in B skiing as well as C basketball. Notably the steering and strength could be enhanced as the dynamics along this line can cross in alignment from one thorax side to the leg of the other side D through the pubis (source with permission from: https://zhuanlan.zhihu.com/p/461700789)

6.2.2 The rectification of Jue (厥): deconstructing misinterpretations and reclaiming its essential meaning

The word *Jue* in pathologies as syncope syndromes (厥证) was rampant with controversies in many generations after its appearance in ancient medical texts.[67] Without any trace how it came about, various theorizations, on its name as noted from *Huang Di Nei Jing* and *Shang Han Lun* (《伤寒论》*Treatise on Cold Damage*) and from traces of ancient literature, were made with some wild possibilities to posit the naming, yet all generally not satisfactory. Generations of disputes persisted over the meaning of Jueyin disease from different aspects, levels, and perspectives, covering theoretical and practical sides. All are barely well evidenced. Without fully and comprehensibly explaining the actual connotation of Jueyin disease or the word *Jue* (厥) itself and its origin, it would be better to start from its root derivative *Ni* (𠂤), which meant "not fit nor well (𠂤，不顺也)".[68]

For the interest of differentiation, the root derivative of *Jue* (决) is *Jue* (夬). This act being assertional, "夬" is yang, also evidenced as "in firmness would determine away softness (刚决柔也)".[69] On the other hand, the root derivative *Ni* (𠂤) simulates in oracle bones an inverted figure (象倒转人形),[70] and also simulates the earth intertwined (象地穿交陷其中也)[71]—both conceptually yin. Its related word *Jue* (欮) meant "reversed flow of qi (气逆)", with a negative connotation for the body. *Jue* (欮) in *Shuo Wen Jie Zi* (《说文解字》*Elucidations of Script and Explications of Characters*) referred to its ancient *Zhuan* script (篆) as *Jue* (癥).[72] In time, in connection with body ills, current orthodox TCM use the word, from *Huang Di Nei Jing*, *Jue* (厥) (yet not "癥", as it should rather have a cap radical "疒" for connotation of illnesses), in describing the Jueyin as well as body failing with cold limbs or as syncope-related illnesses which include violent syncopal problems associated with acutely violent, chilled, heated, scorching, raged, and corpse-like states (暴厥、寒厥、热厥、煎厥、薄厥、尸厥) described in *Huang Di Nei Jing*. Nevertheless, currently *Jue* (厥) is somehow viewed as *Ni* (逆 adverse) and experts have openly expressed that "Jue means adverse (厥，逆也)".[73] Yet this denotation or meaning as *Ni* (逆) was never expressly described in any way as such in ancient literature, including those reviewed in *Shuo Wen Jie Zi Zhu* (《说文解字注》*Annotations to Elucidations of Script and Explications of Characters*), or in *Kang Xi Zi Dian* (《康熙字典》*Kangxi Dictionary*).[74,75] Such exceptional explanations meaning adverse should not be taken as real, since *Shuo Wen Jie Zi Zhu* explained expressly that the word *Jue* (厥) has nothing to do with failing. In this important classic, after explaining the various meanings of *Jue* (厥) (none related to "adverse"), it stated "All of the above are the original meanings of *Jue* (以上皆厥之本义)", and further made an important note that "This is a loan word (假借)". The loan word *Jue* (厥) "became popular and the original meaning was lost (假借盛行而本义废矣)". Notably, following the cap radical "厂" over the word *Jue* (欮), then with *Jue* (欮) or *Jue* (癥), the phono-semantic combination made a combination of the ideographic and semantic meanings (从厂欮声，欮或癥字，举形声该会意也).[76] In fact, the ancient might have simply referred *Jue* (厥) to mean "that".[76,77]

Well-rooted for a better understanding, both *Jue* (决) and *Jue* (𠂤) mean changes. A change from *Jue* (决) starts from discretionary (outward) yang assertions. A change in *Jue* (𠂤) starts from natural (intrinsic) yin change. The multiple meanings of words should be appreciated. *Jue* (𠂤) means "moon starting to grow (月始生)".[78] *Shuo* (朔) the related syntagmatic word, with *Jue* (𠂤) assembled with *Yue* (月 moon or month), means "making the origin of all things (朔, 方始万物者也)".[79] With this understanding, these words used for "change" would be well in keeping with the functional meaning for the zigzag lateral yang line for body actuation, and also interiorly for that participatory yin line that supports discretion to allow for determining directions.

In order to resolve any previous misunderstandings, it would be useful to insert a note in terms of the positive or negative meanings of Jue. Used by the ancients, the words *Jue* (决), while nowadays usually assumed positive, can be negative. *Jue* (决) when overdone may be harmful, since "A major decision will cause harm, with many casualties (大决所犯, 伤人必多)".[80] It could also be negative as much as "break (断裂，折断)"[81] as used in current terms in case of fester (决疣溃痈). *Jue* (决) even in ancient times meant damage[82] and its usage was equivalent to *Que* (缺 flaws or gaps).[83] *Jue* (决) at its extreme would mean desperate (绝也).[84] Thus, *Jue* (决) for its negative meaning could be similar to *Jue* (欮). Conversely at another angle, the assumed negative meaning of *Jue* (欮) is not absolute since *Jue* (欮) could mean "excavate (掘、发)".[85] Oddly, *Que* (阙), another word from similar syntagmatics also could also mean "excavate".[86] Simply one may view it as "change".

6.2.3 Settling Jue (厥): the functional localization of the interior yin line for support

It is really difficult for anyone, even ancients, to describe medical subtleties. To distinguish the lines, one for body yang for its outward assertional and actuational changes and one for body yin for its intrinsic allowance in determining direction, ancient medical experts might have used pretext ploy word (假借) as requisite of need for distinguishing the two different connotations for "change". The syntagmatic word *Jue* (厥) assembled from *Jue* (欮) with a cap radical (厂) could have been found helpful. It could distinguish the yang *Jue* (夬 or 决) from yin *Jue* (𠂤 or 欮) since the cap cover (厂) could be useful to denote "interior"—a covered yin—thus applied to the undecided "that participatory yin". Interestingly, *Que*, the word with similar syntagmatics, has been phrased as

"尚付阙阙" which means "still need to decipher (有怀疑的事情暂时不下断语，留待查考)" [as also used under *Que Yi* (阙疑 no subjective assumptions about things or arguments that are in doubt)][87] leaving the question open, or not yet *Jue* (决) decided. All these could be a projection between the connotations of the interior liver yin line that functions over discretionary issues.

All these could have been considerations, even more than just movement-related. Thus in ancient times, even before that of *Huang Di Nei Jing*, the lateral yang line (in the exterior for discretionary outward yang assertions) and "that participatory yin" (in the interior for discretion support for intrinsic yin changes) could be well paired and coupled over manoeuvring for movement and for somatic and mental changes. Finally in due course, more formulation later described the interior liver line to similate the master general (将军) while the exterior lateral gall-bladder line meant for resolution (决断). Described in *Huang Di Nei Jing*, "The liver is likened to a general in the army, smart in discretion for making strategy. The gall-bladder is the official for exacting justness, powering up decisions and judgement (肝者，将军之官，谋虑出焉。胆者，中正之官，决断出焉)".[88]

But over the whole body yangs and yins, before the ancients have all these be definitely established by covering the requisite generalisability conditions under the multidimensional logic, other frames probably need be considered.

7 The finalization of meridian trajectories from 2Y-3Y to 3Y-3Y: comprehensive considerations

7.1 A holistic perspective on meridian integration: the maturation of Jueyin line and the canonization of the "upper 2Y-3Y + lower 3Y-3Y" meridian system

The highly developed sophisticated ancient fine weaving with related concepts of warp and woof influenced the whole body framework. The vertical body lines would be defined as "meridians" over the horizontal ones called "collaterals". Concerns on fascial, sensory, introspectional viewable, therapeutic, theorization akin yin-yang or along nature, all have undergone interpretation and formalization. Such heritage of consequential diversified knowledge would drive medical experts in practicing medicine to formalize the acupuncture model. At least it passed on names of the 11 body lines, recorded in the unearthed meridial figurines and moxibustion canons.[49,63,89] While the ancient Chinese cosmology viewed with the prevailing sky-5 earth-6 principle, and the movement-tripodal concepts reckoned the upper limbs not for ground support and should need no tripodal lines, the lines were finalized with the formality of 5 upper meridians and 3 yang and 3 yin lower meridians. Further on as expected, all yang lines would be over yang body surfaces, and all these should go up to the head, connecting with the sky and atmosphere. This was the conceptual resolution especially in the earliest formulation, such that all the meridians go upwards, whether from the hands or legs, with the exception of the "shoulder meridian" that arises from the ears. The appreciation of *Jue Yin* lines for the lower three yin meridians completed the formalization of 2Y-3Y+3Y-3Y upper plus lower meridians.

Controversies should have been there, since determining yang or yin for the structures in the body in relation to yin-yang could not have been simple and straight forward. While most lines in the unearthed figurines conformed to current orthodox knowledge of meridians, the extent and placement of meridians still presented remarkable controversies. In the Laoguanshan figurine meridians, small characters such as "heart", "lung", "kidney" and "pelvis" were engraved.[90] Oddly with correspondence, the word *Pen* (盆) referring to the pelvis was aptly carved on the lower abdomen of the figurine. In the Laoguanshan figurine, there were 41 lines, that is, 19 more lines were carved in the body. Academics related them to the co-collaterals described in *Huang Di Nei Jing* and other possibilities including different varieties of branching channels or sensory response lines.[26] Besides attempts to equating to known orthodox meridial knowledge, inconsistencies should be taken into consideration, only because studies with much zest could have neglected or underplayed the truly controversial patterns.

7.2 Vascular and qi-blood perfusion: anatomical validation for meridian stabilization

The prevailing framework would change with time. Understanding deepened with re-gathered observations and applications and wholesome reevaluation would open up new needs and exploration. After defining response points and lines from movements and manipulations were gathered, the early sages should have felt the need to expand understanding about the vascular support of the yang movements. Working out "the quality of the blood and the quantity of qi as well as the proportion of blood and qi in the twelve meridians" had become a standard.[14] Dissection in those days would clearly demonstrate the obvious yang perfusion through the femoral arteries at the front of the groin. Perfusion at more distal locations might be yin. What is yang or yin would of course not be simply one structure, just as tendomuscular or fascial sheets may be yang or yin, blood perfusion can similarly be either yang or yin depending on exact functions and locations.

The association of blood and qi may be well appreciated in modern science by the coupling of neural directives and vascular perfusion.[91] *Huang Di Nei Jing*, on the issue of the amount of yin and yang as well as the distribution of blood and qi over channels and meridians,

stated: "Taiyang often contains more blood and less qi... Jueyin often contains more blood and less qi (太阳常多血少气……厥阴常多血少气)", "Shaoyang often contains less blood and more qi...Shaoyin often contains less blood and more qi (少阳常少血多气……少阴常少血多气)", and "Yangming often contains more blood and more qi (阳明常多气多血)",[92] followed by the evidence that "needling on Yangming would let blood and qi out (刺阳明出血气)", "needling on Taiyang would let blood out and hurt qi...needling on Jueyin would let blood out and hurt qi (刺太阳，出血恶气……刺厥阴，出血恶气也)", while "needling on Shaoyang would let qi out and hurt blood, needling on Taiyin would let qi out and hurt blood, and needling on Shaoyin would let qi out and hurt blood (刺少阳，出气恶血；刺太阴，出气恶血，刺少阴，出气恶血)".[92]

In due course, especially when pulses were explored, the upper limb arteries in the hand may have been used to "place" the two yin meridians at the hand. Their correlated anatomy was clearly recorded in the ancient silk meridian books unearthed from Mawangdui Han Tomb.[59,93,94]

7.3 The ascension to 3Y-3Y system: the epistemic leap driven by man-earth-sky insight and the fusion of medical schools

In the broad range of practice and theoretical derivation concepts, it would tend towards diversity of interpretations of observations. In developing the understanding of each part and whole body, there were at least two different schools, Huangdi (黄帝) and Bian Que (扁鹊) of medical practice and doctrines[26,95] that might not yet have settled down one big picture. The plain fact should be obvious that the lines, whether they were lines of response or lines from theorization, were not exactly unified in those days and still carried controversial elements. Even the pericardium meridian was added only later into *Huang Di Nei Jing* to complete the current known twelve meridians. *Nan Jing* (《难经》*The Classic of Difficult Issues*), traditionally attributed to Bian Que, in clarifying, raised questions to difficult and fundamental aspects of *Huang Di Nei Jing*.

The evolution of the meridian system from 11 to 12 channels through all these incremental developments, from cosmological yin-yang, understanding body in yin-yang, body movements in yin-yang, body tripodal yin-yang, to the transitory 2Y-3Y+3Y-3Y upper plus lower meridians required a knowledge leap. Before then, there must have been a lot of discussion and debate amongst ancient scholars on response points and lines, and their relevance to collective understanding of organ functions. The collective understanding of organ functions yet had not been passed down in words for want of a comprehensive framework. The shift from 2Y-3Y+3Y-3Y upper plus lower meridians to 3Y-3Y+3Y-3Y upper plus lower meridians was a difficult paradigm shift that would not occur unless a knowledge leap towards wholesome man-earth to earth-sky understanding could be well related. In time, *Huang Di Nei Jing* built up a comprehensive model with the wholesome 3Y-3Y embracing sky-earth continuum for concordance of the body configuration, so that it could allow a framework for understanding organ functions amenable for predictive and therapeutic methods. As finally Zhang Zhongjing (张仲景) laid down a clinical method through this framework, it passed on the great movement of herbal medicine in TCM besides the formerly great ancient repertoire of acupuncture.

8 Conclusion: achievements, limitations and remaining research work

The shift from early, observation-based concepts to a more systematized and theoretical framework had been achieved with formation of the upper 2Y-3Y + lower 3Y-3Y meridian framework. This older classical medicine framework might yet not have embraced other features such as organ functions and those for cosmological sky-earth including relevance to 12 months, or those projecting and predicting body-climate concordance. Body concepts for practice could not go forward without the understanding of its concordance with nature realized.

This must have been a monumental feat that cosmological view and observational body response lines complement each other for practice and worked in both the Huangdi and Bian Que schools. The framework already facilitated classical medicine good enough a lot of therapeutic successes evident and some well recorded in history. The final synthesis of the 3Y-3Y framework was an even greater feat. Maybe in time, clinical observations on pulse facilitated its development by driving understanding of the positioning of the third upper yin line, with the persistent median artery (PMA) variant found. This anatomical variant of forearm artery, which typically regresses after its fetal development that occasionally persists into adulthood and found as pulses in the inner middle longitudinal line of the forearm as equivalent to the Hand Jueyin meridian,[96–98] would allow the upper 3Y-3Y be recognized, beyond the 2Y-3Y configuration. Further on, insufficiency might have been raised as the older model was unable to estimate how lines could reach down to the toes and drove the need for a more comprehensive understanding. None of the moxibustion canons described any defined response points at the toes, except for the big toe (that may represent Taiyin and Jueyin) and were un-named.[49] Similarly in Shuangbaoshan figurine, there were no defined response points at the toes, except for the Yangming meridian which reached the extremity of the third toe (as it ended at this same site in *Huang Di Nei Jing*).

Time often opened up more understanding on top of what was known, and knowledge synthesized and

transformed through development over the requisite standards and practical application could over history form powerful medical methods. The meridians became orthodoxies. The texts remained. Nevertheless, the stage was set for further expansion. The comprehensive 3Y-3Y framework came about only after the understanding of the true concordance for the body internally and externally to match with sky-earth continuum and atmospheric influence. To go forward, that required a convincing sky-earth continuum model. The derivation of this wholesome 3Y-3Y system was lost in time, and not understood. This would be expounded in another subsequent paper through the cultural remains of those times. The quest in developing a unified "theory" of everything has been cherished in the past as well as present scholars.

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Feature Article

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OPEN

The Multifaceted *Du* (毒): Practitioners' Understanding and Clinical Applications in Traditional Chinese Medicine

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Abstract

Du (毒) commonly denotes poison and toxicity, carrying a negative connotation of harm in modern Chinese. However, within traditional Chinese medicine (TCM), *Du* possesses more diverse connotations. Through the examination of historical scholar-physicians' works and semi-structured interviews with modern TCM practitioners, this research argues that *Du* should be understood in a relational way rather than merely as an intrinsic property of substances. From medical practitioners' perspective, *Du* emerges from the interaction between substances and the human body. Firstly, substances that induce strong and undesired bodily sensations can be categorised as *Du*, denoting both potency and potential harm. Secondly, *Du* has also been interpreted as *Pian Xing* (偏性 imbalanced qualities of materia medica), referring to medicine's qi (气 property) and *Wei* (味 flavour). These qualities, determined through sensory perceptions such as taste and smell, are the source of both therapeutic efficacy and potential harm if misused. Thus, in this context, the concept of *Du* does not inherently carry positive or negative connotations. Thirdly, when practitioners use *Du* to denote harm, this harm is generated from dynamic interplay among medicines, formulas, practitioners and patients. The interaction between these factors determines whether medicines will cause harm, rather than any inherent quality of the medicines themselves. However, influenced by modern science, the focus has shifted to isolated toxic components, moving away from the holistic emphasis on the lived body's experiences. This shift has also influenced practitioners' clinical use of *Du*-possessing medicines, which are regarded as toxic medicines.

Keywords: *Du* (毒); Poison; Potency; *Pian Xing* (偏性 imbalanced qualities of materia medica); Relationality; Practitioners; Traditional Chinese medicine

1 Introduction

In the early 1990s, a Belgian study reported that herbal weight loss remedies containing aristolochic acid led to kidney damage in women, a condition termed *Zhong Cao Yao Shen Bing* (中草药肾病 Chinese herbal medicine nephropathy).[1] This incident brought global attention to the safety and side-effects of Chinese materia medica (中药). Consequently, in 2001, the Department of Health in the United Kingdom prohibited aristolochic acid and any herbs containing it, as well as other herbs with the same Chinese names as those containing this substance.[2]

Approximately a decade later, *Long Dan Xie Gan Wan Shi Jian* (龙胆泻肝丸事件 Gentiana Liver-detoxifying Pill Incident) once again drew public attention to the safety and side-effects of Chinese materia medica. Media reports revealed that the herb *Guan Mu Tong* (关木通 Caulis Aristolochiae Manshuriensis), used in the formula called *Long Dan Xie Gan Wan* (龙胆泻肝丸 Gentiana Liver-detoxifying Pill), caused kidney damage due to its aristolochic acid content.[1] This incident prompted Chinese regulatory authorities to revoke the medicinal standards for *Guan Mu Tong*. Subsequently, it was removed from the updated edition of the Chinese pharmacopoeia, namely *Zhong Hua Ren Min Gong He Guo Yao Dian* (《中华人民共和国药典》 *The Pharmacopoeia of the People's Republic of China*) in 2005.

These two events have triggered intense global debates about the safety of Chinese materia medica, making it a critical issue in the governance of traditional Chinese medicine (TCM). From these incidents, it is evident that aristolochic acid, a toxic component, has become the benchmark for determining a medicine's toxicity. However, this approach significantly differs from the conventional Chinese method of categorizing medicines as either *You Du* (有毒 possessing *Du*) or *Wu Du* (无毒 without *Du*). This shift reflects a fundamental difference

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in evaluating *Du* (毒) of medicines between modern scientific standards and TCM practices.

Despite the decrease in debates regarding the safety and toxicity of Chinese materia medica in recent years, discrepancies in the understanding of medicine's *Du* persist in present-day clinical practice. During my research at a TCM hospital in China, one phenomenon particularly caught my attention. I observed that patients would sometimes leave the clinic room and return after a few minutes holding their prescriptions. They would inform their doctor, Dr. Wang, that the hospital's pharmacy had flagged an issue regarding the use of certain materia medica, prompting Dr. Wang to sign the prescription again. Subsequently, Dr. Wang would receive the prescription, sign next to the specific medicines that the pharmacists queried and then return it to the patients for them to obtain their medication. The reason for duplication of his signature was that the dosage of some medicines in his formula, typically classified as *You Du*, exceeded the regulated limit specified in the Chinese pharmacopoeia. For the sake of safety and liability exemption, a double-check was mandated.

Therefore, influenced by the global medical science's concern for "safety" and "side effects", the criteria for evaluating the *Du* of Chinese materia medica have changed. In light of this shift, it is necessary to re-examine the multifaceted nature of *Du* in TCM. Through the examination of foundational medical texts, historical scholar-physicians' (Note 1) works and semi-structured interviews with eight contemporary TCM practitioners (Note 2), this research aims to explore how TCM practitioners understand *Du* and negotiate its multiple interpretations in clinical practice.

In this article, I examine these interpretations through the lens of relationality. Rather than treating *Du* as an intrinsic and stable property of a medicinal substance, a relational perspective emphasizes that *Du* should be understood within specific contexts in which multiple factors interact with each other. Against this backdrop, this paper addresses the following questions: What are the multiple connotations of *Du* in TCM? How do traditional understandings of *Du* continue to inform contemporary perspectives? In what ways does modern toxicological discourse reshape these views? And how do these layered interpretations influence therapeutic decision-making in the everyday clinical practice of TCM practitioners?

As a pivotal and polysemous concept within TCM, the meaning of *Du* varies across different contexts. As Liu pointed out, no single English expression could adequately capture the meaning of *Du*.[3] Therefore, in this paper, I translate it differently depending on the context. In discussing *Du* within Chinese materia medica, I will adopt Liu's translation approach, which highlights the contextual understanding of *Du* from a TCM perspective in a relational manner. When the positive sense of healing is evident, *Du* will be translated as "potent" or "potency", while in cases where the negative sense of harm is apparent, *Du* will be rendered as "poisonous", "poisoning" or "poisonousness".[3] Additionally, I may leave *Du* untranslated to underscore its ambivalent meaning (Fig. 1). However, given the increasing scientific research on Chinese materia medica, modern practitioners also possess knowledge of medicine based on modern toxicology. Therefore, when discussing *Du* in relation to biomedically determined understanding, emphasising chemical components, I will translate *Du* as "toxic" or "toxicity", highlighting the inherent properties of the medicine.

2 *Du* as substance: poison and potency

As previously noted, in modern scientific contexts, discussions of *Du* in Chinese materia medica often refer to isolated toxic chemical compounds that cause physiological harm, such as aristolochic acid. In contrast, while *Du* in TCM texts also pertains to substances, its meaning is grounded in a different conceptual framework. Through the examination of classical TCM texts and interviews with modern TCM practitioners, it becomes evident that *Du* serves as a classificatory criterion in the pharmacological system of TCM.

For example, *Shen Nong Ben Cao Jing* (《神农本草经》 *Shen Nong's Classic of the Materia Medica*), the earliest systematic text on materia medica, included 365 medicinal substances (Fig. 2). In defining their qualities, the text stated, "Medicines have five flavours: sour, salty, sweet, bitter, and pungent. They also possess four qi: cold, hot, warm, and cool, as well as possessing *Du* or without *Du* (药有酸、咸、甘、苦、辛五味，又有寒、热、温、凉四气，及有毒、无毒)" (Note 3).[4] Here, *You Du* and *Wu Du* are positioned alongside qi (气 property) and *Wei* (味 flavour) as fundamental classificatory dimensions of medicines.

Shen Nong Ben Cao Jing further organized the 365 medicines into three tiers: the higher-level medicines, totalling 120, were purported to nurture life; the 120 middle-level medicines were supposed to nurture the nature; and the 125 lower-level medicines were used for curing illnesses. This classification was explained in the following passage:

> "The 120 kinds of higher-level medicines are the lords. They do not possess *Du*. Taking them in large amounts or for a long period does not harm people. The 120 kinds of middle-level medicines are the ministers. Some of them do not possess *Du*, while others do. One needs to gauge carefully the proper use of them. The 125 kinds of lower-level medicines are the assistants and envoys. Most of them possess *Du*. One may not take them for long periods.
> 上药一百二十种为君，无毒，多服、久服不伤人。中药一百二十种为臣，无毒有毒，斟酌其宜。下药一百二十五种为佐使，多毒，不可久服。"(Note 4)[4]

In this classification, *Du* stands out as a crucial criterion for differentiating medicines. This passage

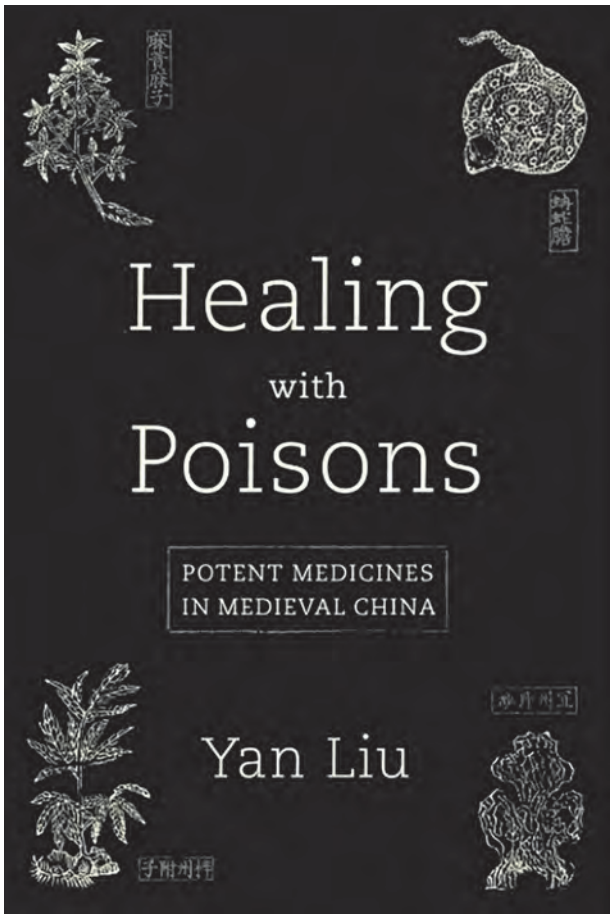


Figure 1 Cover of *Healing with Poisons: Potent Medicines in Medieval China* by Yan Liu (刘焱) (2021) (source with permission from: photo taken by the author)

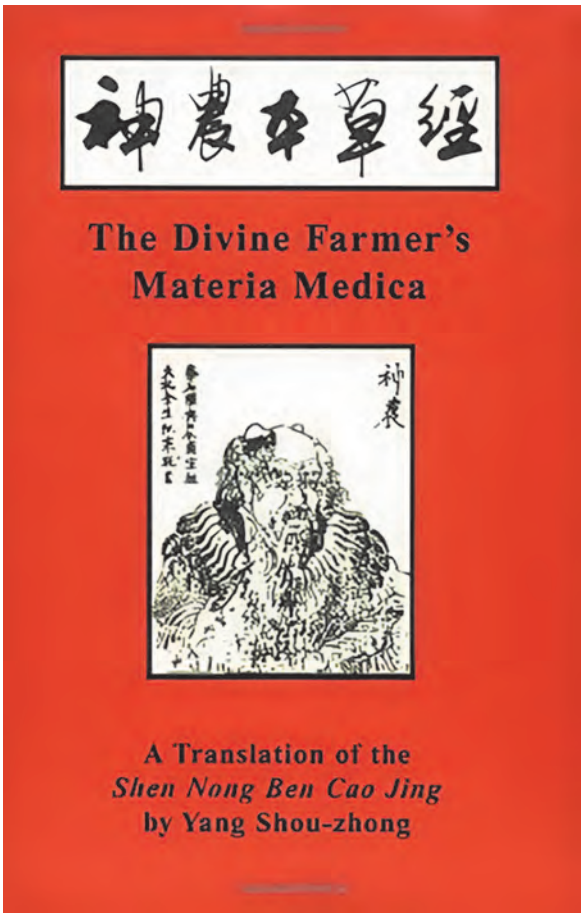


Figure 2 Cover of *The Divine Farmer's Materia Medica: A Translation of the Shen Nong Ben Cao Jing* by Yang Shouzhong (杨守忠) (1998) (source with permission from: photo taken by the author)

indicated that the compilers of *Shen Nong Ben Cao Jing* were already aware of the potential harm posed by *Du*-possessing medicines. Thus, caution is advised when using such medicines. Physicians in later periods also acknowledged the harmful effects that may arise from *Du*-possessing medicines. For instance, in volume 26 of *Zhu Bing Yuan Hou Lun* (《诸病源候论》*Treatise on the Origins and Manifestations of Various Diseases*), *Gu Du Zhu Bing Xia* (《蛊毒诸病下》The second section of diseases caused by *Gu* poison), Chao Yuanfang (巢元方) discussed *Du*-possessing medicines, stating: "Those medicines categorized as possessing *Du* and possessing great *Du*, can all cause disturbances and harm to individuals and even kill people (凡药物云有毒及有大毒者，皆能变乱于人为害,亦能杀人)".[5] Here, Chao Yuanfang clearly emphasized the harmful potential of *Du*-possessing medicines.

In this following passage, Chao Yuanfang further distinguished between different degrees of *Du*. Although all such *Du*-possessing medicines can be dangerous, their harmfulness varies, as indicated by the range of bodily symptoms they provoke—those with greater poisonousness tend to elicit more severe reactions.[5] This gradation was elaborated in the fundamental text *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*), chapter 70, which further divided the category of *You Du* into three levels: *Da Du* (大毒 great poisonousness), *Chang Du* (常毒 moderate poisonousness) and *Xiao Du* (小毒 mild poisonousness), reflecting varying intensities of poisonousness.[6]

The classification was adopted by physicians in subsequent periods. For example, in passage 5, volume 48 of *Jing Yue Quan Shu* [《景岳全书》*The Complete Works of (Zhang) Jingyue*], Zhang Jiebin (张介宾) discussed *Du Cao* (毒草 poisonous herbs), examining *Du*-possessing medicines and their uses.[7] In his categorization, the medicines followed the classification system outline in *Huang Di Nei Jing*, remaining divided into two primary categories: *You Du* and *Wu Du*. The *You Du* category was further subdivided into great, moderate and mild degrees of poisonousness. This differentiation of *Du* continued to appear in modern TCM textbooks, illustrating its enduring influence on Chinese medical thought over the past two millennia. Accordingly, Wang and Zhang[8] argued that *Du* in classical medical texts should be understood primarily as poisonous, aligning with the prevalent contemporary understanding of *Du* as harmful.

However, although *Du*-possessing medicines may cause harm, they are not something that needs to be avoided at all costs.[3] Instead, *Du* denotes a form of potency that can be valuable for curing illness. As noted in the text, "Those who wish to eliminate cold, heat, and evil qi, to break stagnation and accumulations, and to cure illnesses should rely on the lower-level category (欲除寒热邪气，破积聚愈疾者，本下经)" (Note 5).[4] This reflects an early recognition that *Du* not only signifies harmful qualities associated with poison but also conveys a sense of therapeutic efficacy and potency.

Several scholars have explored this duality. For example, Paul Unschuld argued that in medico-pharmaceutical texts from the Han dynasty onwards, the term *Du* appeared to convey two different notions: "poison" and "active curative strength", with the latter being the dominant meaning in materia medica literature.[9] Liu examined the prominence of poisons in Chinese pharmacy from the Han dynasty to the Period of Division, highlighting the paradoxical relationship between poison and medicine.[3] In this context, *Du* carries a strong sense of potency that constitutes a medicine's therapeutic power. Similarly, Yu, through an exploration of the concept of *Du* in TCM across different historical periods, argued that *Du* refers to the substances that are not only harmful to the human body but also possess intense or potent effects.[10]

Additionally, in her research on traditional Chinese pharmacology in the thirteenth century, Ulrike Unschuld also argued against translating the term *Du* as "toxicity", noting that the Western notion of toxicity differed from its use in classical Chinese pharmacy.[11] She contended that the terms *You Du* and *Wu Du* were better understood through analogy with the German terms *Heildrogen* (medicines endowed with "acutely curative virtue") and *Kurdrogen* (medicines endowed with "chronically curative virtue"), thereby linking *Du* more closely to the idea of potency than to harm.[11]

This conceptualization of *Du* as potency is reflected in Zhang Congzheng's (张从正) *Ru Men Shi Qin* (《儒门事亲》 *Confucians' Duties to Their Parents*). In volume 1, passage 1, Zhang Congzheng distinguished between two types of formulas based on the speed of their effects: *Huan Fang* (缓方 slow-acting formulas) and *Ji Fang* (急方 quick-acting formulas). The presence or absence of *Du*-possessing medicines served as a key criterion in this differentiation. As Zhang Congzheng noted, "There are slow-acting formulas using non-poisonous medicines to treat illnesses. Since these medicines do not possess *Du*, their effects are slower (有无毒治病之缓方，盖性无毒则功自缓矣)".[12] "By contrast, there are quick-acting formulas with *Du*-possessing medicines. These *Du*-possessing medicines can induce vomiting and purging. They can effectively alleviate the illness (有药性有毒之急方,盖有毒之药,能上涌下泄,可以夺病之大势也)".[12] In this context, *Du* is associated with curative strength and therapeutic immediacy.

As Liu noted, a marked divergence existed between European and premodern Chinese pharmaceutical traditions.[3] While European pharmacy gradually categorized some highly poisonous substances as absolute poisons devoid of medicinal values, such a concept of absolute poison never arose in premodern China. The utilization of poisonous substances has long constituted the cornerstone of Chinese pharmacy, persisting throughout the imperial era. This traditional perspective continued to inform the thinking of some contemporary practitioners.

For example, Dr. Chen, during our interview, explicitly distinguished between the modern biomedical notion of "toxicity" and the Chinese medical concept of *Du Xing*. In pharmacological and toxicological terms, toxicity refers to substances that can cause irreversible damage to the human body, particularly when they exhibit a narrow therapeutic window—that is, when the effective dose closely approaches the toxic dose, resulting in a high risk of adverse effects. Such substances are therefore regarded as possessing intrinsic toxicity within modern risk-based frameworks.

In contrast, *Du Xing* in TCM does not primarily denote inherent harmfulness. Rather, it refers to medicines with potent, intense and often fast-acting effects that demand careful preparation, precise dosage control and appropriate clinical usage. From this perspective, substances characterized as *Du* are not categorically excluded from therapeutic practice; instead, their potential risks and benefits are assessed relationally, depending on how they are used in clinical practice.

However, while the connotation of being potent or potency remains acknowledged, among many modern TCM practitioners today, the term *Du* is more commonly associated with harm as its primary meaning. For example, Dr. Ye defined *Du* as any substance capable of eliciting adverse bodily responses or causing harm. Regarding the relationship between potency and harmfulness, Dr. Ye argued that these two aspects are inherently interconnected, asserting that it is inappropriate to consider them separately. In her view, *Du* inherently carries a negative connotation, denoting the potential to inflict harm. Mere potency, without associated harm, does not qualify a substance as *Du*; only when a substance exhibits both potent effects and the potential for harm can it be classified as such. This understanding is further illustrated by examples Dr. Ye provided. She cited cases such as *Yao Du* (药毒 medicine-induced poisoning), which can lead to liver abscesses or nephritis; *Jin Shi Du* (金石毒 metal or mineral poisoning), referring historically to alchemical substances and today to chemical reagents; *Ci Bi Qi Wei* (刺鼻气味 pungent odours), such as those from low-quality construction materials or beauty products; and *Chong Shou Du* (虫兽毒 insect and animal poison), such as snake venom. These examples reflect the aetiology, focusing on the poisonous or pathogenic properties of substances, and align more

closely with the modern biomedical concept of toxicity, in which harm is the primary concern.

Similarly, Dr. Wang echoed this perspective by articulating a more explicit typology of *Du*. He defined *Du* as substanced capable of causing harm to the human body and classified it into three types: *Jue Dui Du Xing* (绝对毒性 absolute poisonousness), *Xiang Dui Du Xing* (相对毒性 relative poisonousness), and *Xu Ji Du Xing* (蓄积毒性 cumulative poisonousness). According to Dr. Wang, *Jue Dui Du Xing* refers to substances with universally lethal properties, capable of causing severe damage or death regardless of individual constitution, and therefore are best avoided in clinical use. Examples include *Gou Wen* (钩吻 Gelsemii Radix et Rhizoma), *Lang Du* (狼毒 Radix Euphorbiae Fischerianae), and *Pi Shuang* (砒霜 Arsenicum Sublimatum) (Note 6), as well as other non-medicinal substances such as potassium cyanide. Ingesting these substances is widely recognized as posing an extreme risk of severe injury or death. These examples closely align with substances that modern toxicology identifies as containing highly potent and experimentally verified toxic constituents, including alkaloids, diterpenoids, and highly toxic inorganic compounds.

Thus, in contemporary practice, the concept of absolute poisonousness has increasingly become accepted among TCM practitioners. Certain substances are now viewed as ontologically distinct from medicines—defined primarily by their capacity to cause harm and excluded from therapeutic use altogether. This marks a significant conceptual shift in the understanding of *Du* within TCM discourse, signalling a shift from a relational, use-dependent understanding of poisonousness toward a more substance-centred framework shaped by modern toxicological principles.

3 *Du* as *Pian Xing* (偏性 imbalanced qualities of materia medica)

In addition to poison and potency, another frequently referenced concept related to *Du* in Chinese materia medica is *Pian Xing* (偏性 imbalanced qualities of materia medica). For most modern TCM practitioners, *Du* refers to the imbalances of a medicine's qi and *Wei*, which are expressed through the four qi: cold, hot, warm and cool, and the five flavours: sour, bitter, sweet, pungent and salty. Additionally, as Frédéric Obringer noted, Chinese medicines were supposed to possess a certain *Du* to be considered effective.[13] In this sense, *Pian Xing* is viewed as the source of a substance's therapeutic efficacy.

This idea is clearly articulated by Zhang Jiebin in *Lei Jing* (《类经》*The Classified Classic*), volume 14, passage 15, where he stated, "The reason why medicines can be used to treat diseases is their *Du*. The so-called *Du* refers to the imbalanced qualities of their qi and flavours (药以治病，因毒为能，所谓毒者，以气味之有偏也)".[14] Zhang Jiebin further differentiated food from medicine based on the nature of their qi and flavours—specifically, whether they were balanced or imbalanced. He explained, "Those with the balanced qi and flavour belong to the category of grains and foods, which nourish the body's healthy qi. Those with the imbalanced qi and flavour are classified as medicines, which can dispel the body's pathogenic qi (盖气味之正者，谷食之属是也，所以养人之正气。气味之偏者，药饵之属是也，所以去人之邪气)" (Fig. 3).[14]

A similar view is found in the writings of Zhu Zhenheng (朱震亨), a prominent physician of the Yuan dynasty. In his *Ge Zhi Yu Lun* (《格致余论》*Further Discourses on the Acquisition of Knowledge through Profound Study*), he also drew a distinction between food and medicine. He stated, "the stomach qi is pure and harmonious. It is only compatible with grains, meat, vegetables and fruits. By contrast, the qi of medicinal substances and minerals is all imbalanced; even medicines like ginseng and astragalus root have imbalanced characteristics, let alone those attacking medicines (夫胃气者，清纯冲和之气也，惟与谷肉菜果相宜。盖药石皆是偏胜之气，虽参芪辈为性亦偏，况攻击之药乎)".[15] Accordingly, while food is understood to possess balanced and harmonious qualities suited for nourishing the body, medicinal substances are typically characterized by their imbalanced nature. The degree of imbalance also varies: tonifying herbs like *Ren Shen* (人参 Radix et Rhizoma Ginseng) and *Huang Qi* (黄芪 Radix Astragali) possess relatively mild imbalances, whereas more aggressive attacking medicines display stronger deviations from balance.

This understanding of the medicines' efficacy—rooted in the concept of imbalanced qualities—reflects a unique view of illness and treatment principles in TCM. According to Zhang Jiebin, "Illness in humans arises from a state of imbalance, in which either yin (阴) or yang (阳) predominates. To rectify such imbalance, only substances with imbalanced qi and flavour can do that, while those with balanced attributes fall short (正以人之为病，病在阴阳偏胜耳。欲救其偏，则惟气味之偏者能之，正者不及也)".[14]



Figure 3 Exhibition of Chinese herbal medicines in the Guangdong Chinese Medicine Museum (source with permission from: photo taken by the author)

This idea that "TCM treats illness by using the imbalances of medicinal substances and minerals to rectify the imbalances of the human body (以药石之偏纠人体之偏)" was also repeatedly mentioned by the modern TCM practitioners I interviewed. For instance, at the beginning of our discussion on *Du*, Dr. Chen introduced three interrelated concepts: *Du Xing* (毒性 poisonousness), *Yao Xing* (药性 the nature of medicine), and *Pian Xing*. In his view, these three concepts are interchangeable to some extent. The conventional interpretation of *Du* in TCM pertains to the medicine's imbalanced qualities, which can be characterized by *Si Qi Wu Wei* (四气五味 four qi and five flavours). As these imbalanced qualities of materia medica are believed to be the origin of therapeutic efficacy, *Pian Xing* can also be referred to as *Yao Xing*. However, if the medicines are improperly processed or misused by practitioners, these same qualities can also result in harm, thus are termed as *Du Xing*.

Similar arguments can also be found in the writings of historical scholar-physicians. In *Jing Yue Quan Shu*, Zhang Jiebin challenged the binary classification of medicines as either *You Du* or *Wu Du* found in *Shen Nong Ben Cao Jing*. He wrote: "As stated in *Ben Cao* (《本草》, referring to *Shen Nong Ben Cao Jing*), some medicines possess *Du* while others do not possess *Du*. I, however, strongly disagree with this perspective. They do not realize that there is no medicine without *Du*. Thus, medicines with hot qualities have heat *Du*, and those with cold qualities have cold *Du*. If one uses them improperly, they can harm people. It is also because of *Du* (即如《本草》所云某有毒、某无毒，余则甚不然之，而不知无药无毒也。故热者有热毒，寒者有寒毒，若用之不当，凡能病人者，无非毒也)".[7] In this account, *Du* denotes the *Pian Xing* of medicines, with harm arising from their improper use rather than from any intrinsic poisonousness.

In volume 2, passage 17 of *Ru Men Shi Qin*, Zhang Congzheng also expressed a similar understanding of the concept of *Du*. He stated, "All medicines are *Du*. It is not only those medicines with great *Du* or mild *Du* that should be regarded as *Du*. Even medicines like *Gan Cao* (甘草 Radix et Rhizoma Glycyrrhizae) and *Ku Shen* (苦参 Radix Sophorae Flavescentis) should be seen as *Du*, as prolonged use will inevitably lead to imbalances. The prolonged increase and accumulation of qi is the reason for premature death (凡药皆毒也。非止大毒、小毒谓之毒，虽甘草苦参，不可不谓之毒，久服必有偏胜。气增而久，夭之由也)".[12] Here, *Du* is also related to the *Pian Xing* of medicines, whereby even herbs commonly regarded as "non-poisonous" may generate harm through prolonged use and the resulting imbalance.

In this sense, *Pian Xing* represents a neutral characteristic, neither inherently beneficial nor harmful. Whether it manifests positively or negatively depends on clinical context and application. This perspective emphasizes the consequences of medicine misuse. If medicines cause harm, it is not due to the intrinsic nature of the substance itself, but rather the way it is employed. This calls for a relational understanding of *Du* in TCM—one that considers its effects in context rather than attributing fixed properties to the substances alone. This relational view will be further explored in the following section.

4 *Du* as harm: a relational understanding in TCM

As previously discussed, the concept of *Du* in Chinese materia medica should not be understood as an inherent attribute of the substance itself. Rather, *Du* must be approached relationally, shaped through dynamic interactions within the clinical context when it refers to the harm caused during the clinical practice. In this section, drawing on Hsu's Gestalt psychological approach, I will examine this relational understanding through three interrelated dimensions: the practitioner, the patient and the materia medica (Fig. 4).[16] While these elements are deeply intertwined in real-world clinical practice, they are analytically separated here for the sake of clarity and structured discussion.

4.1 The practitioner's decisive role: pattern differentiation, dosage control, and duration of use

Both historical scholar-physicians and contemporary TCM practitioners underscore the critical role of the practitioner in determining the potential harm caused by Chinese medicines. In other words, harm does not arise from the medicine per se, but from its improper use by the practitioner.

As Zhang Jiebin noted in *Jing Yue Quan Shu*, volume 47, passage 5, "Even everyday food and drink, originally intended to nourish the body with their balanced flavours, can pose harm if excessively consumed or misused, let alone medicines with imbalanced qualities and flavours (即如家常茶饭，本皆养人之正味，其或过用误用，亦能毒人，而况以偏味偏性之药乎)".[6] Similarly, Xu Dachun (徐大椿), a prominent Qing dynasty physician, also emphasized that "even benign medicines such as *Gan Cao* or *Ren Shen*, when improperly administered and resulting in harm, fall within the category of *Du Yao* (虽甘草、人参，误用致害，皆毒药之类也)".[17] These statements illustrate that even substances ordinarily regarded as food or non-poisonous medicines may become harmful when applied inappropriately or excessively. In this sense, it is not the inherent nature of the medicine, but the practitioner's understanding and mode of application, that ultimately determines whether a medicine heals or harms.

Contemporary practitioners echo these concerns. Dr. Wang provided an example to illustrate this point:

> "Winter melon is a cold/cool-quality medicine, which can be used to remove or alleviate heat-induced disorders. So, if someone with excess internal heat eats it, its cold/

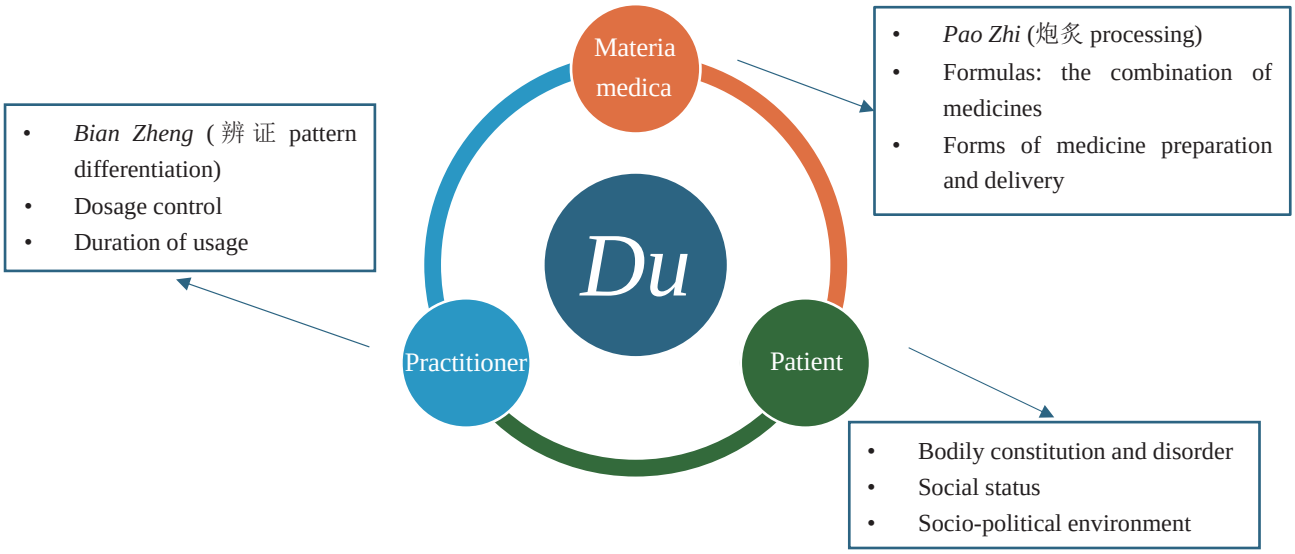


Figure 4 Relational dynamics among the practitioner, the patient and materia medica (source with permission from: picture made by the author)

> cooling nature will benefit them, devoid of any harmful effects. However, if someone with *Yang* depletion of the spleen and stomach consumes it, it might cause adverse reactions such as diarrhoea, which is considered a kind of cold *Du*."

Despite being the same substance, winter melon can have entirely different effects depending on the individual's constitution and condition. This underscores the importance of accurate *Bian Zheng* (辨证 pattern differentiation) by the practitioner in preventing potential harm. In this view, any resulting harm is not inherent to the medicine itself but rather to the practitioner's malpractice.

Moreover, careful control of dosage and duration of use is also vital to avoiding harm. *Shen Nong Ben Cao Jing* instructed that: "When treating illnesses with *Du*-possessing medicines, one should begin with a dosage equivalent to a sorghum grain. Once the illness is eliminated, one should stop using it. If the illness is not cured, double the dosage. If it remains, increase it by tenfold. Dosage adjustments should be measured by the elimination of the illness (若用毒药疗病，先起如黍粟，病去即止，若不去倍之，不去十之，取去为度)" (Note 7).[3] This passage demonstrates that from the early stage of TCM development, both dosage and duration of use were explicitly emphasized. Potent or poisonous medicines were to be applied initially in minimal amounts and discontinued as soon as therapeutic effects were achieved, thereby preventing unnecessary harm resulting from excessive dosage or prolonged use.

Huang Di Nei Jing further linked the degree of *Du* with the appropriate duration of administration. It advised that for medicines classified as possessing great *Du*, moderate *Du*, mild *Du* and without *Du*, they should be discontinued once the illness has receded by six-tenths, seven-tenths, eight-tenths, and nine-tenths respectively. After stop using the medicines, one should rely on foods, such as grains, meats, fruits, and vegetables, to restore the body's balance.[5] This is also mirrored by Dr. Ye, who stated, "When employing poisonous medicines, their dosage and the usage time should be precisely regulated to mitigate any adverse effects. I will stop using it as soon as possible after recovery". This suggests that the more potent or poisonous a medicine, the shorter the period it should be used, implying that prolonged use can transform therapeutic substances into sources of harm.

Additionally, many practitioners referenced high-profile cases (as discussed in the introduction) to illustrate how harms resulted not from the medicines themselves but from clinical mismanagement. For example, Dr. Wang discussed *Mu Tong* (木通 Caulis Akebiae), a relative herb to the restricted herb *Guan Mu Tong*, noting: "In small doses and for a short period, *Mu Tong* acts as a diuretic, reducing swelling and assisting in the elimination of kidney stones. But if you consume it excessively over a long period, it might result in kidney damage". Thus, the adverse outcomes associated with the *Long Dan Xie Gan Wan* Incident were not due to the herb or the formula per se but rather represent iatrogenic harm—errors in diagnosis, dosage and duration of use. These arguments reinforce the understanding that *Du* is not an intrinsic or fixed attribute of a medicinal substance, but a relational phenomenon that emerges from inappropriate clinical practice.

4.2 The patient's central position: the interplay of constitution, disorder, social status and socio-political environment

In addition to the practitioner's role, the effects of medicines are also contingent upon the patient's condition and circumstances. Whether a medicine is experienced as therapeutic or harmful depends not only on how it is prescribed, but also on patient-specific factors, such as

bodily constitution and disorder, social status and the broader socio-political environment.

Zhang Congzheng, for instance, argued that even when patients suffer from the same disorder, treatment should be tailored to differences in social class and physical condition. In volume 11, passage 7, he compared the treatment of disorders resulting from drinking and eating among wealthy gentry and poor peasants. "For those who live a life of luxury and idleness, indulging in excessive eating and drinking, which leads to retention of fluids in the middle jiao, nausea, fullness and acid regurgitation, they can take *Mu Xiang Dao Yin Wan* (木香导饮丸 Costus Root Digestive Pill) for treatment. On the other hand, those who live in the countryside, with simple food and clothing and engaged in manual labour, if affected by food and drink, experiencing abdominal fullness, acid regurgitation and occasional vomiting of sour fluid, they can use *Jin Shi Wan* (进食丸 Digestion Promoting Pill), as they can withstand the potent medicines (凡膏粱之人，起居闲逸，奉养过度，酒食所伤，以致中脘留饮，恶闷、痞膈、醋心，可服木香导饮丸治之。若田野刍荛之人，食疏衣薄，动作劳役，若酒食所伤，心腹满闷、醋心、时时吐酸水，可用进食丸，以其胜毒也)".[12]

According to Zhang Congzheng, those who live in the countryside and engage in manual labour generally have more robust bodies compared to wealthy and idle individuals. This allows them to tolerate the effects of potent medicines, which might otherwise be harmful to the physically weaker elite. The capacity to withstand the effects of a potent medicine is not only a matter of physical constitution but also reflects the socio-economic conditions that shape a person's health and resilience. Thus, whether a potent medicine acts as a poison or a therapeutic agent is deeply connected to the patient's constitution, which, in turn, is inseparable from their social status.

In volume 1, passage 4, Zhang Congzheng provided another example that illustrated the complex interaction between medicine usage, patients' bodies and broader socio-political environments. In this case, he discussed the treatment of *Nue* (疟 intermittent fever) in different times. "Specifically, during times of peace, even the use of poisonous medicines like *Pi Shi* (砒石 Arsenicum Sublimatum) and *Chen Sha* (辰砂 Cinnabaris Cinnabarum) for treatment can be effective. This is because, in peaceful times, the populace is calm and stable, allowing the heat of the medicines to counteract the body's heat with fewer complications. However, during times of turmoil, when people are weary and distressed, using medicines with great *Du* and great heat should be avoided. If the heat of the medicine is used to attack the body's heat in such conditions, it can lead to severe complications, such as vomiting blood, bleeding, abscesses, ulcers and severe vomiting (治平之时，虽用砒石、辰砂有毒之药治之，亦能取效。缘治平之时，其民夷静，故虽以热攻热，亦少后患。至于扰攘之时，其民劳苦，不可遽用大毒、大热之药。若以热攻其热，甚则转为吐血、泄血、痈疽、疮疡、呕吐之疾)".[12]

Here, Zhang Congzheng emphasized that both the internal state of the body and external socio-political environment shaped the effectiveness and safety of medicines. Treatment suitable for one historical context may be harmful in another, further illustrating the dynamic and relational conception of *Du*.

This relational view was echoed by other Ming and Qing scholar-physicians who criticized the abstract classification of medicines as inherently "beneficial" or "harmful" without considering the patient's specific disorders. In *Yu Yi Cao* (《寓意草》*Draft of Symbolic Significance*), Ming dynasty physician Yu Chang (喻昌) criticized the phenomenon of solely focusing on the qualities of materia medica while neglecting consideration of patients' disorders and bodily conditions. He questioned how physicians could effectively assess the goodness or harmfulness of medicines without taking into account the specific ailments of their patients (若不论病，则药之良毒善恶，何从定之哉) (Note 8).[18]

A similar critique appeared in Wu Tang's (吴瑭) *Yi Yi Bing Shu* (《医医病书》*The Book Addressing Issues in Physicians' Practice*). He stated, "If one disregards the illness and focuses only on debating the suitability of materia medica, they may fear the purging effects of medicines with cold qualities and the drying effects of those with heat qualities. Physicians become mere armchair strategists, akin to playing the zither with the pegs glued. Meanwhile, patients rely on hearsay, preferring flattery over honest advice. I question the efficacy of such an approach (若不论病之是非，而议药之可否，寒者畏其泄，热者畏其燥，医者纸上谈兵，胶柱鼓瑟，病者以耳为目，恶直好谀，吾不知其可也)".[19] He further contended, "When the medicine is suitable for the disorder, even poisonous medicines are elixirs; when the medicine is not suitable for the disorders, even grains and foods become poisonous medicines (如对症，毒药亦仙丹；不对症，谷食皆毒药)".[19]

Thus, Wu Tang, like Zhang Congzheng and Yu Chang, insisted that poisonousness was not an inherent quality of the substance itself. Instead, it must be understood in a relational context, particularly in terms of its interaction with the patient's disorders. He further suggested that "Whether it is the patient or the physician, the focus should be on diagnosing the illness, determining the appropriate treatment method, and selecting the suitable formula and medicines. Physicians need to align the treatment with the specific condition, whether it requires cold, hot, warm or cold remedies. There is no inherently good or no bad medicine; it all depends on how it is used. A skilled physician, when applying the appropriate method, will always achieve positive results (无论病家、医士，只当讲求病系何病，法当用何法，方当用何方，药当用何药，对准病情，寒热温凉，皆在所用，无好无恶，妙手空空，无不见效)".[19]

This principle also extends to contemporary clinical practices, as illustrated by Dr. Ye's example of *Fu Zi* (附子 Radix Aconiti Lateralis Praeparata), a well-known poisonous herb. Dr. Ye explained, "For the majority of healthy individuals, occasional consumption of *Fu Zi* may induce sensations of body heat and mouth dryness. However, individuals with heightened sensitivity may experience warmth around the navel area. Conversely, individuals with yin depletion may experience exacerbated symptoms, including acne, toothache, insomnia, irritability, and restlessness, upon aconite consumption. In contrast, individuals with *Yang Xu* (阳虚 yang deficiency) may not experience notable effects upon consumption, and their symptoms of *Yang Xu* may alleviate". This highlights how the same medicine can have drastically different effects depending on the patient's constitution.

Dr. Ye further emphasized that even for the same person, the body's condition could vary over time, leading to different responses to the same medicine. She recommended that I experiment with consuming ginger under various bodily conditions, such as during normal circumstances, when feeling cold, or experiencing internal heat. Despite being the same individual and ingesting the same substance, differing bodily states evoke distinct sensations.

In short, evaluating the harmfulness of Chinese materia medica requires careful consideration of the patient's overall condition, which extends beyond their physical health and medical disorders. It is also crucial to account for their social status and the socio-political environment in which they live. Even for the same individual, practitioners must consider how their bodily condition can vary over time. Disorders are not isolated or disembodied entities. They are inseparable from the person and the surrounding environment. Similarly, the concept of *Du* should be viewed in the same relational context, where its potential harm or therapeutic benefits depends on the interplay of various factors, including the patient's unique constitution and external circumstances.

4.3 The transformative potential of materia medica: the mediating role of processing, formula combination, and dosage forms

While the preceding discussion has highlighted the roles of practitioners and patients in shaping whether medicines heal or harm, Chinese medical texts also locate *Du* within the material and technical transformation of the medicines themselves. As Liu pointed out, classical Chinese pharmacy rarely used poisons directly. Rather, it had developed a variety of pharmaceutical techniques, including medicine processing and medicine combination to transform poisons into medicines.[3] One key strategy was *Pao Zhi* (炮炙 processing), which was used to modify the nature of *Du*-possessing medicines before administration.

As stated in the preface of *Shen Nong Ben Cao Jing*, "As for the *Du*-possessing medicines, they should be processed. When processing them, the medicines to which they are averse or those that kill them can be used (若有毒宜制，可用相畏、相杀者)" (Note 7).[3] From a modern pharmacological standpoint, *Xiang Wei* (相畏 mutual restraint) and *Xiang Sha* (相杀 mutual suppression) refer to interactions where the toxicity or side-effects of one medicine can be reduced or eliminated by another when used in combination.[20] In other words, with appropriate processing, the risks associated with potent medicines can be minimized (Fig. 5).

For example, Zhang Jiebin illustrated this point through the example of *Fu Zi*. He stated that, "Although the nature of *Fu Zi* is said to be poisonous, if it is processed according to proper methods and used in an appropriate manner, how could it be poisonous (矧附子之性，虽云有毒，但制得其法，用得其宜，何毒之有)" (Note 8).[6] Although *Fu Zi* is traditionally classified as a *Du*-possessing medicine in materia medica texts, Zhang's statement makes clear that its harmful effects are not inevitable. Rather, the poisonous potential of *Fu Zi* is contingent upon its processing and clinical application.

Aside from medicine processing, the combination of medicines is another critical strategy for the safe use of potent medicines. This view is reflected in Dr. Ye's assertion that "it is not individual medicines but the formula as a whole that yields therapeutic efficacy". She emphasized that formulas are not mechanical assemblies of ingredients but synergistic compositions in which each medicine is carefully selected to produce integrated effects. To explain this, Dr. Ye drew an analogy to cooking: just as the taste of stir-fried cabbage and pork is distinct from tasting each ingredient separately and in sequence, the flavour of vinegar-glazed cabbage cannot be replicated by merely mixing vinegar, sugar, and cabbage in the mouth. The culinary process transforms the ingredients into a cohesive whole—so too do formulas



Figure 5 Posters of processing methods in the Guangdong Chinese Medicine Museum (source with permission from: photo taken by the author)

mediate the interaction of their components to produce a unified therapeutic outcome.

Extending the culinary analogy further, the form of medicine preparation and delivery, much like cooking technique, significantly influences a medicine's therapeutic effects. According to *Shen Nong Ben Cao Jing*, medicines could be prepared as pills, powders, decoctions (from boiling in water or soaking in alcohol), or pastes made from pulverized ingredients.[3] Generally, liquid forms were considered fast-acting, as they were more readily assimilated by the body. Conversely, solid forms such as pills and powders were believed to deliver more gradual effects—an important consideration when administering *Du*-possessing medicines, whose effects needed to be moderated.[3]

In summary, as Andersen et al. argued, signs, symptoms, sensations, and diagnoses were not pre-existing entities simply waiting to be observed. Instead, they were constructed within the clinical encounter, emerging through a distributed network of interactions among people, materials, and interpretations.[21] This perspective aligns closely with the understanding of *Du* in TCM. The harmfulness associated with potent medicines is not an intrinsic and fixed attribute. It is contextually generated through the relational dynamics of clinical practice. When practitioners use *Du* to denote harm, this harm is generated from dynamic interplay among practitioners, patients and materia medica. It is the configuration of these interactions that determines whether a medicine causes harm, rather than any inherent toxic quality of the medicine itself.

5 The clinical usage of *Du*: safety or efficacy?

Building on the previous discussion, which has demonstrated that the harmful meaning of *Du* in TCM is not an intrinsic property of medicinal substances but emerges from the dynamic interaction among practitioners, patients and materia medica, this section turns to the contemporary clinical use of potent or poisonous medicines.

Although many modern TCM practitioners continue to acknowledge the therapeutic efficacies of medicines traditionally classified as *Du*-possessing or potent, they also concede that such medicines are now used far less frequently in clinical practice than in the past. This shift does not reflect a denial of their therapeutic values. Rather, it reflects the growing influence of modern toxicology and pharmacological risk frameworks, which tend to redefine certain Chinese medicines in terms of inherent biochemical toxicity. As a result, contemporary clinical decision-making increasingly prioritises safety, often leading practitioners to restrict or avoid the use of potent medicines despite their acknowledged efficacy.

For example, Dr. Wang stated, "When treating disorders with TCM, my personal understanding is to avoid using medicines that are absolutely poisonous. There is no necessity to use them. Medicines like *Da Ji* (大戟 Radix Euphorbiae Pekinensis) and *Yuan Hua* (芫花 Flos Genkwa) are effective in draining water downward, which can be beneficial for treating liver cirrhosis. However, their high poisonousness warrants caution, and if there is any uncertainty, it is advisable not to use them. Similarly, for medicines with clear accumulated poisonousness such as *Mu Tong*, they should be employed cautiously and in small amounts. If there is any doubt, it is best to refrain from their usage too".

Regarding why Dr. Wang refrained from using poisonous medicines in his clinical practice, the primary reason he provided was the reluctance of practitioners to take such risks within the current medical environment. In other words, the use of poisonous medicines in modern China entails numerous potential risks. For example, the regulation of *Du*-possessing medicines constitutes a significant aspect of Chinese medicine governance, which directly impacts practitioners' medicine usage. Presently, as highlighted by many practitioners, the regulation of Chinese materia medica overly emphasizes safety rather than efficacy. Moreover, the standards by which these medicines are regulated are predominantly based on modern toxicology principles rather than the traditional understanding of TCM. This shift in focus has led to a situation where using medicines considered to contain toxic compounds may cause legal issues for practitioners, even if the harm is not directly related to the medicine itself but to other factors in the treatment process. This is in line with the phenomenon where medicines that are abandoned or heavily regulated are those confirmed to have high toxicity through modern laboratory experiments.

Additionally, when working within hospital or institutional settings, exceeding the recommended dosage outlined in the Chinese pharmacopoeia often leads to rejection at pharmacies. In some cases, experienced staff within the pharmaceutical department may still dispense the medication, but such instances are exceptions rather than the rule. Based on my observations made at Dr. Wang's clinic in Guangzhou, patients are typically directed back to the prescribing doctor to obtain authorization for such dosages, like the scenario presented at the beginning of this paper. On one hand, this additional step serves as a safeguard to ensure patient safety. On the other hand, this process also carries legal implications, particularly given the deviation from established pharmacopeial standards, which are used as benchmarks in legal proceedings. This highlights the tension between the traditional clinical practices of TCM and the modern legal and regulatory frameworks that govern medical practice today (Fig. 6).

Based on his personal experiences, Dr. Wang provided two examples in the Chinese pharmacopoeia to illustrate



Figure 6 Cover of *The Pharmacopoeia of the People's Republic of China* (2025) (source with permission from: photo taken by the author)

the discrepancies between official regulation and clinical practice. Firstly, he mentioned *He Shou Wu* (何首乌 Radix Polygoni Multiflori), where modern research revealed cases of hepatotoxicity in some patients. Consequently, the Chinese pharmacopoeia lists a dosage range of 3 g to 6 g for safety purposes. However, according to Dr. Wang's personal experience, this dosage is insufficient for optimal efficacy. Yet, increasing the dosage to ensure effectiveness could potentially heighten risks, especially given the Chinese pharmacopoeia's authoritative status in legal matters.

Similarly, the regulated dosage range for *Fu Zi* is 3 g to 15 g. However, in cases of severe *Yang Sheng Yin Xu* (阳虚阴盛 yin excess with yang deficiency), a higher dosage may be required for effective treatment. Yet again, deviating from the regulations outlined in the Chinese pharmacopoeia entails certain risks. Thus, the strict control over the dosage of *Du*-possessing medicines significantly influences their clinical usage. Furthermore, the regulation of *Du*-possessing medicines also impacts medicine availability. For instance, in the works of Zhang Zhongjing, *Sheng Fu Zi* (生附子 Aconiti Radix) is commonly used despite being highly poisonous, as its efficacy is believed to stem from this poisonousness. However, obtaining raw aconite is exceedingly challenging in modern TCM hospitals. Instead, practitioners typically have access to *Pao Fu Zi* (炮附子 Radix Aconiti Lateralis Preparata).

Another reason Dr. Wang mentioned is that many poisonous medicines are simply unnecessary. Nowadays, TCM primarily focuses on treating chronic diseases, while biomedicine is generally perceived as being more adept at addressing acute and severe illnesses. Therefore, modern TCM practitioners rarely encounter patients whose conditions necessitate the use of these poisonous medicines to save their lives. If a patient's condition requires such intervention, they are typically admitted to the inpatient department where biomedicine is the dominant treatment method. As a result, the patient's body condition often does not warrant the use of these poisonous medicines in modern TCM practice.

In short, in contemporary TCM, the primary consideration in the use of medicines is their safety, which is heavily influenced by modern toxicology. This shift has impacted the regulation of Chinese materia medica, especially with respect to *Du*-possessing medicines, and has further shaped their clinical use. Modern TCM practitioners are increasingly cautious about using *Du*-possessing medicines due to the potential risks they may pose. Additionally, the distinction between biomedicine and TCM, particularly in the treatment of chronic versus acute conditions, plays a crucial role in the limited use of potent medicines, as chronic disorders typically do not require such powerful substances.

6 Conclusion

Although in modern usage of the Chinese language *Du* generally denotes poison or toxicity and carries strong negative connotations, its meaning within TCM is more nuanced and multifaceted. By drawing on both historical texts and interviews with contemporary practitioners, this study contributes to a more refined understanding of how *Du* has been conceptualized and operationalized in clinical practice.

First, the notion of *Du* emerges from the interaction between substances and the human body, rather than residing solely within the chemical or material composition of the medicine. Practitioners frequently associate *Du* with the bodily sensations that certain medicines elicit—especially when those sensations are intense, unpleasant, or difficult to manage. In this sense, *Du* connotes not only danger but also potency. When used properly, it has potent therapeutic efficacy. When used improperly, it may become harmful. This dual connotation complicates the assumption that *Du* simply equates to "poison".

This therapeutic efficacy or harmfulness is closely related to another connotation of the concept of *Du*, *Pian Xing*, which mainly refers to the medicine's qi and *Wei*. This understanding of the medicine efficacy—rooted in the concept of imbalanced qualities—reflects a distinctive therapeutic logic in TCM: to rectify the imbalances of the human body by using the imbalances of medicinal substances and minerals. As such, harm attributed to *Du* is not synonymous with toxicity in the biomedical sense but arises from a dynamic interplay between multiple factors: the practitioner's knowledge and application of the medicine, including its processing

and formulation, dosage, dosage form and duration of usage, the patient's constitution, disorder, social status, and broader socio-political environment. This relational understanding is echoed in historical writings and affirmed by modern TCM practitioners, who view clinical efficacy and harm as outcomes co-produced by these intersecting actors. In this view, *Du* is not an intrinsic trait of a medicine but an emergent property of its interaction with a specific therapeutic context.

However, the relational understanding of *Du* has been increasingly challenged by the influence of modern biomedical frameworks, which emphasize the identification and isolation of toxic components. This shift has reshaped not only the theoretical conceptualisation of *Du*, but also the clinical use of *Du*-possessing medicines. TCM practitioners today often hesitate to prescribe potent medicines due to regulatory restrictions and a growing emphasis on biochemical toxicity. As a result, the rich and embodied knowledge that historically informed the use of such medicines is being gradually displaced by more standardised and reductionist approaches.

By revisiting both traditional and contemporary practitioners' understandings of *Du* in TCM, this paper calls for a critical re-evaluation of the regulation and clinical use of *Du*-possessing medicines in modern practice. A relational perspective on *Du* does not reject modern toxicology but complements it by foregrounding use, dosage and clinical context as central determinants of safety and efficacy. Such an approach may contribute to more nuanced dosage regulation and pharmacopeial classification, encourage the systematic integration of practitioners' experiential knowledge into guideline-making, and provide a conceptual basis for allowing TCM to develop in accordance with its own therapeutic logic. Together, these measures may facilitate more individualised clinal practice and enable the safer and more informed use of potent medicines within contemporary regulatory frameworks.

Notes

1. For more information on scholar-physicians, see: Bates D. Scholarly ways of knowing: an introduction. In: Bates D, eds. *Knowledge and the Scholarly Medical Traditions*. Cambridge: Cambridge University Press; 1995. p. 2.
2. In this research, I conducted interviews with eight modern TCM practitioners based in China and the United Kingdom, as outlined in the appendix table. All of them had an educational background in China. Most of these interviews were conducted online, except for Dr. Chen, whom I visited at his clinic in London. Analysis of our conversations revealed that while each practitioner offered unique insights shaped by their backgrounds and experiences, there were significant areas of overlap. Thus, in this paper I will primarily focus on the interpretations of the concept of *Du* as articulated by three practitioners: Dr. Ye, Dr. Wang and Dr. Chen. Their perspectives will serve as the primary basis for discussion, supplemented by relevant insights gleaned from other practitioners where applicable.
3. The translation is mine elaborating on: Yang SZ, ed. *The Divine Farmer's Materia Medica: A Translation of the Shen Nong Ben Cao Jing*. Boulder: Blue Poppy Press; 1998. p. xii.
4. The translation is based on: Liu Y. *Healing with Poisons: Potent Medicines in Medieval China*. Seattle: University of Washington Press; 2021. p. 28.
5. The translation is mine elaborating on: Yang SZ, ed. *The Divine Farmer's Materia Medica: A Translation of the Shen Nong Ben Cao Jing*. Boulder: Blue Poppy Press; 1998.p. xii., and Liu Y. *Healing with Poisons: Potent Medicines in Medieval China*. Seattle: University of Washington Press; 2021. p. 28.
6. While Dr. Wang categorized *Pi Shuang* as absolute toxicity, he also mentioned its potential therapeutic use in treating leukaemia during our subsequent discussion. However, he expressed a negative attitude toward its experimental use. This apparent contradiction underscores the ambiguous and paradoxical attitudes surrounding such poisonous medicines. For a detailed examination of the historical physicians' varying understandings of *Pi Shuang*, see: Obringer F. A Song innovation in pharmacotherapy: some remarks on the use of white arsenic and flowers of arsenic. In: Hsu E, eds. *Innovation in Chinese Medicine*. Cambridge: Cambridge University Press; 2001. p. 192–213.
7. The translation is mine elaborating on: Yang SZ, ed. *The Divine Farmer's Materia Medica: A Translation of the Shen Nong Ben Cao Jing*. Boulder: Blue Poppy Press; 1998. p. xiii.
8. The translation here is not verbatim.

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Author contributions

DAI Binli drafted and reviewed the article.

Conflicts of interest

The authors declare no financial or other conflicts of interest.

Appendix: Interview questions

Note: RQ = Research question; IQ = Interview question

Practitioner's general understanding of *Du*

1. (RQ) How do you understand the relevant debates surrounding the concept of *Du* of Chinese medicine as portrayed in newspapers and social media?
   - (IQ) What do you think are the reasons behind these debates?
   - (IQ) Are there any other comments on this phenomenon?
2. (RQ) How do you interpret the concept of *Du* in different contexts within Chinese medicine?
   - (IQ) What do you think is the meaning of *Du* in Chinese medicine? Is there any difference when talking about *Du* in different Chinese medicine contexts?
   - (IQ) Is there any difference between the daily and biomedical understanding of *Du* (such as harmful and poisonous) and its context in Chinese medicine? If so, what are these differences?

Understanding of *Du* and clinical practice

3. (RQ) Which concept(s) of *Du* do you believe is more applicable in clinical practice? (The researcher will list different meanings and ask practitioners to choose.)
   - (IQ) There are different understandings of *Du* in Chinese medicine, such as potent, poison, toxicity, medicine, side effects, and medicinal property, etc. Which one do you think is more applicable in clinical practice? Or do you have any additional thoughts on the meaning of *Du*?
4. (RQ) What are the descriptions of the concept of *Du* in the medical texts, and how do they differ compared to their application in clinical practice?
   - (IQ) In many medical texts, there are numerous records of *Du*. For example, in the *Shen Nong Ben Cao Jing* (《神农本草经》The Divine Farmer's Classic of Materia Medica), materia medica are categorised as *Wu Du* (无毒 without *Du*), *You Du* (有毒 possessing *Du*) and *Duo Du* (多毒 highly poisonous). What role do these records in medical classics play in your medical practice?

Changes of understanding of *Du*

5. (RQ/IQ) What changes have occurred in the understanding of *Du* between pre-twentieth century and post-twentieth century times?
6. (RQ/IQ) What are the reasons behind these changes (such as influences from biomedicine, national politics, modern botanical system, pharmaceuticals, etc.)?
7. (RQ/IQ) What specific impacts (such as prescription practices, toxicological and ethnobiological assessments of poisons, types of diseases treated, knowledge transmission, etc.) have resulted from these changes?
8. (RQ/IQ) What is your perspective on the use of highly poisonous materia medica, such as *Fu Zi* (附子 Aconiti Radix), within the 'Fire Spirit School' with high dosages?

Relationship between various actors

9. (RQ) How should we understand the relationship between humans, medicine, and pots that are

Appendix Table Information of eight TCM trained interlocutors

Name	Age	Information	Location
Dr. Wang	Early 60s	A renowned TCM doctor specializing in cardiovascular diseases	Guangzhou, China
Dr. Ye	Late 20s	A Ph. D. student in medical history, as well as a TCM doctor who received education both from university and family transmission	Tianjin, China
Dr. Ma	Late 30s	A young TCM doctor who is fond of *Jing Fang* (经方 Classical formulas recorded in medical books of Zhang Zhongjing)	Guiyang, China
Dr. Peng	Mid 30s	A young TCM doctor who is one of the students of Dr. Wang	Guangzhou, China
Dr. Dong	Late 20s	A Ph. D. student in Integrative Oncology of Traditional Chinese and Western Medicine	Beijing, China
Dr. Chen	Early 50s	An experienced TCM doctor with a background in clinical Chinese materia medica	London, The United Kingdom
Dr. Xu	Late 40s	An experienced acupuncturist	London, The United Kingdom
Dr. Huang	Late 40s	An experienced TCM doctor who is interested in the annotation of medical classics	London, The United Kingdom

ascribed qualities of *Du*? What cultural influences shape this understanding?

- (IQ) How do you define *Du* in the context of Chinese medicine?
- (IQ) What factors do you think we should consider when discussing *Du*?
- (IQ) What is the cultural influence behind this understanding?

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Original Article

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Origins of Etiological Thought in Traditional Chinese Medicine: Insights from Shang Oracle-bone Medical Inscriptions

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Abstract

The oracle-bone inscriptions related to medical issues encompass disease names, causes, progression, and treatment methods, reflecting the Shang (商) people's understanding of diseases. This study, employing interdisciplinary perspectives from philology and traditional Chinese medicine (TCM), explores the Shang dynasty's understanding of disease etiology and its manifestations in TCM. The Shang people's understanding of disease causation can be summarized as spiritual disturbances and harm from insects or curses. Spiritual disturbances are categorized into three aspects: diseases sent by the *Shang Di* (上帝 Supreme Deity), diseases caused by deceased persons who had transformed into deities, and diseases associated with nightmares. Concepts in TCM, such as diseases caused by emotions, environmental pathogens, and the relationship between nightmares and diseases, can be traced back to early understanding of disease causation reflected in oracle-bone divinations. Furthermore, specific TCM treatments, such as *Gui Men Shi San Zhen* (鬼门十三针 Thirteen Ghost Points) and *Zhu You Shu* (祝由术 Zhuyou therapy), are deeply influenced by the concept of spiritual disturbances. The Shang people's understanding of disease causation has profoundly impacted the formation and development of etiological theory in TCM, evident not only in theoretical explanations of disease causes but also in specific medical practices. By studying the concepts of disease causation in medical-related oracle-bone inscriptions, we can gain a deeper understanding of the development of ideas, theoretical systems, and treatment methods related to disease causes in TCM.

Key words: Oracle-bone inscriptions (甲骨文); Traditional Chinese medicine; Etiology; Spiritual disturbances; *Gu* (蛊 demonic parasites)

1 Introduction

The initial discovery of oracle-bone inscriptions originated from a traditional Chinese medicine (TCM) ingredient known as *Long Gu* (龙骨, Os Draconis, literally meaning "inscribed turtle plates"). As archaeological excavations progressed, an increasing number of oracle-bone materials were unearthed, attracting significant scholarly attention and resulting in increasingly rich and diverse research findings. These inscriptions predominantly document divination topics, covering a wide range of areas, including military affairs, sacrificial rites, hunting, travel, astronomical phenomena, agriculture, childbirth, and disease. Among them, records related to diseases and medical conditions have garnered particular interest from scholars of TCM.

Detailed analyses of these records have revealed insights into the understanding and treatment of diseases during the Yin-Shang (殷商) period, including disease names, symptom descriptions, etiological explanations, and predictions of disease progression.[1] These discoveries not only mark significant advancements in modern oracle-bone studies but also suggest that the concepts of disease during the Shang period contained early traces of traditional Chinese medical thought, influencing the development of later medical theories. Zhu Shengyu (朱生玉) and Gao Fei (高飞) provided a comprehensive review of research achievements concerning medical data in the oracle-bone inscriptions.[1] Previous scholarly discussions regarding the etiological concepts reflected in oracle-bone inscriptions are detailed in Section 2 of this paper. Explorations of disease causation within the historical development of TCM have also been undertaken. Ye Xinmiao (叶新苗) posited that during the Spring and Autumn period, understanding of disease

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etiology began to emancipate itself from the notion of spiritual disturbances.[2] Li Chengwei (李成卫) et al. argued that early TCM lacked a clear distinction between *Bing Xie* (病邪 pathogenic factors), *Bing Yuan* (病源 sources of disease), and *Bing Yin* (病因 etiological concepts), further pointing out that the formal conceptualization of TCM etiology was marked by the publication of Chen Wuze's (陈无择) *San Yin Ji Yi Bing Zheng Fang Lun* (《三因极一病症方论》 *Treatise on Diseases, Patterns, and Formulas Related to the Unification of the Three Etiologies*) during the Southern Song dynasty.[3] Jiao Zhenlian (焦振廉) examined the historical trajectory and limitations of TCM etiological theory, noting that conceptualizations of disease causation, accumulating since the Shang and Western Zhou dynasties, transitioned into a phase of theoretical systematization and elaboration during the Spring and Autumn and Warring States periods.[4] Zhang Guangji (张光霁) examined historical understandings of etiology, noting that during the Shang dynasty, shaman-physicians attributed diseases either to afflictions sent by celestial deities or disturbances caused by ancestral spirits.[5] Zhang Qiming (张启明) classified etiological factors into eight categories: pathogenic microorganisms, parasites, immunogens, injuries, medical errors, chemical toxins, congenital factors and foreign matters.[6] As knowledge and research deepen, the academic understanding of TCM etiology has become increasingly scientific. Nevertheless, the earliest explorations of disease causation inevitably trace back to the oracle-bone inscriptions. Certain studies within the historiography of TCM have also addressed the concepts of disease etiology found in oracle-bone inscriptions. However, these discussions typically remain brief mentions or superficial treatments, lacking substantial in-depth investigation.

This paper focuses on the records of disease causation in oracle-bone inscriptions, analyzing their underlying medical ideas and their influence on subsequent TCM theory. This study is the first to systematically examine two major categories of disease causation concepts found in oracle-bone inscriptions: "supernatural affliction"—including illnesses caused by the *Shang Di* (上帝 Supreme Deity) (Note 1), ancestor spirits, and nightmares—and "harm by *Chong* or *Gu* (虫或蛊 insects or demonic parasites)". It reveals the deep historical connections between these early beliefs and traditional Chinese medical theories such as pathogenesis by *Qi Qing* (七情 seven emotional disturbances) and *Liu Yin* (六淫 six pathogenic factors). The study traces the origins of traditional Chinese etiology explicitly back to the Shang dynasty, establishing a direct historical continuity. By combining perspectives from paleography and TCM, the research deciphers key disease-related terms in oracle-bone divinations—such as *Gu* (蛊 demonic parasites), *Zhao* (肇 cause), and *Nie* (孽 harm)—and provides empirical evidence of how Shang conceptions of disease causation were preserved and adapted in later Chinese medical practices. For example, therapeutic methods such as *Gui Men Shi San Zhen* (鬼门十三针 Thirteen Ghost Points) and *Zhu You Shu* (祝由术 Zhuyou therapy) are direct inheritances of the belief in supernatural affliction. The graphological structure of the character *Feng* (风 wind), incorporating the *Chong Bu* (虫部 insect radical), reflects an early pathological understanding of wind as a carrier of demonic influences. Furthermore, the study illustrates how supernatural etiological models evolved into naturalistic explanations—such as the Shang belief in "nightmare-induced illness", which later developed into the *Huang Di Nei Jing*'s (《黄帝内经》 *The Yellow Emperor's Inner Classic*) physiological theory of dreams caused by imbalance in the viscera, qi, and blood. These findings provide a critical historical link in the formation of traditional Chinese medical etiology.

2 Causes of diseases as seen in oracle-bone inscriptions

In academic circles, interpretations of the Shang people's understanding of disease causation vary. Based on analyses of divination inscriptions related to health, Hu Houxuan (胡厚宣) argued that the Shang people attributed disease to "either the intervention of heavenly gods or ghosts".[7] Yan Yiping (严一萍) categorized the causes into four types: illnesses inflicted by heavenly gods, curses from ghosts, pestilence caused by demonic forces, and changes in astronomical phenomena.[8] Zhan Yinxin (詹鄞鑫) observed that the Shang people ascribed disease to calamities sent by the heavenly emperor and curses from spirits.[9] Xu Jinxiong (许进雄) summarized that the Shang people attributed illness to four main causes: spirit curses, sudden weather changes, improper diet, and nightmares.[10] Li Zongkun (李宗焜) proposed that the Shang people believed diseases were caused by divine and ghostly curses, which included "calamities sent by the heavenly emperor and deities", "afflictions from ancestors", and "warnings from ghosts".[11] Li Liangsong (李良松) identified four contributing factors: curses from the heavenly emperor and ghosts, injuries caused by external agents such as insects or animals, illnesses resulting from environmental factors like wind and rain, and internal conditions arising within the body.[12,13]

From these perspectives, it is evident that, while scholars differ in their specific classifications, they generally emphasize the significant role of spirits and deities in the Shang worldview. Synthesizing these viewpoints, it can be concluded that the Shang people primarily attributed disease causation to two main causes: disturbances caused by spirits and ghosts, and harm inflicted by legendary venomous insects.

2.1 Disturbance by deities and ghosts

In the cosmology of the Shang dynasty people, the occurrence of disease was regarded as a "divine matter"

intimately connected with supernatural forces. They believed that powerful deities—especially the *Shang Di*, departed ancestral spirits, and wandering ghosts and demons—could directly intervene in the human world, sending illness as a form of punishment, warning, or malevolent affliction. This belief in "spiritual causation" constituted the core paradigm through which the Shang people understood disease and structured their responses to illness. This conception of divine affliction can be categorized into three principal forms: (1) the supreme authority of *Shang Di* to bestow illness, (2) the familial connection through which ancestors brought harm, and (3) the mystical portents of illness through dreams and nightmares. Rooted in religious belief, this transcendent view of etiology not only deeply influenced the divinatory and sacrificial practices of the Shang but also laid the foundational groundwork for many concepts and therapeutic methods in later traditional Chinese medicine.

The first is diseases sent by the *Shang Di*. For example:

(1) Tested: (There will be) no fallen illness. (HJ 13855)
贞: 亡降疾。(Fig. 1)
(2) Tested: (There will be) no fallen illness. (HJ 13856)
贞: 亡降疾。(Fig. 2)
(3a) Tested: It is the *Shang Di* who has caused the king's illness.
贞: 唯帝肇王疾。(Fig. 3)
(3b) The *Shang Di* has caused the king's illness.
□帝肇王疾。
(3c) Tested: it is not the *Shang Di* who has caused the king's illness. (HJ 14222)
贞: 不唯下上肇王疾。



Figure 1 HJ13855 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=123611)



Figure 2 HJ13856 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=123612)



Figure 3 HJ14222 front Bing (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=124067)

The term *Jiang* (降 to send down) carries the meaning of descending from above, implying that the power to "send down illness" belongs to the highest deity in the Yin belief system, known as the *Shang Di*. Although other deities may also cause illness, the term *Jiang* is never used in those cases. Regarding the phrase *Zhao Wang Ji* (肇王疾 causing illness in the king), most scholars interpret the character "肇 (*Zhao*)" as meaning "begin", "initiate", or "trigger". For example, Zhan Yinxin interpreted "肇" as "to begin",[9] thus understanding "唯帝肇王疾" as a divination asking, "Has the *Shang Di* caused the king of Shang to begin to suffer from illness?" Takashima Kenichi (高岛谦一) reconstructed the meaning of "肇" as "to make (some undifferentiated mass) into divisions" or "to make (some bonded or lodged things) free", and translated it as "cure".[14] Fan Yuzhou interpreted "肇" as "to trigger".[15] In any case, "帝肇王疾" implies that the *Shang Di* inflicted illness upon the reigning king.

The second type refers to deities transformed after a person's death. In the beliefs of the Shang people, the ancestors of Shang kings and certain prominent nobles were transformed into deities after death, capable of inflicting harm or illness. Examples include:

(4) It is Ancestor Xin who harmed the king's eyes. (HJ 1748)
唯<祖>辛𦎫 (害) 王目。
(5) Tested: It is deceased mothers who caused the king's illness. (HJ 2521 A)
贞: 唯多妣肇王疾。
(6) Tested: The illness of the teeth is caused by Father Yi. (HJ 13649)
贞: 疾齿唯父乙𦎫 (害) 。
(7) Crack making on the day of □Wu, Nan tested: The foot is ill, and is the illness caused by Huang Yin. (HJ 13682)
□午卜，殼贞: 有疾趾唯黄尹𦎫 (害) 。
(8) Crack making on the day of Wuzi, Bin tested: There is something wrong with the king's hearing, and is it caused by *Zu Yi*. (HJ 1632 front)
戊子卜，宾贞: 王耶，唯祖乙孽我。
(9) Launch a sacrificial ritual of protecting from illness in the foot harmed by Father Yi. (HJ 13688)
御疾趾于父乙孽。
(10) Tested: The king's illness is caused by the Great Ancestor. (HJ 13697 front Yi)
贞: 王疾唯大示。

In the divinations listed above, "deceased mothers", "Father Yi", "Zu Yi", and "Great Ancestors" refer to ancestral deities. "Huang Yin" was an old minister from the Shang dynasty, and numerous inscriptions mentioned sacrifices offered to him. The characters "𦎫" and "孽" both carry meanings of harm, suggesting that these illnesses were thought to result from those deities. Although the last divination does not include verbs like "肇 (cause)" , "𦎫 (harm)" , or "孽 (harm)" , the context implies that the king's illness was attributed to the Great Ancestor.

The last type concerns nightmares. Examples are as follows:

(11) Crack making on the day of Dinghai, Zheng tested: The king had a dream, which involved his teeth. (HJ 11006 front)
丁亥卜，争贞: 王梦，唯齿。
(12) Tested: The king dreamed of illness in his teeth, caused by □. (HJ 17385)
贞: 王梦疾齿唯□。
(13) Tested: Ya has repeated nightmares, and they might not result in illness. Fourth month. (HJ 17448)
贞: 亚多鬼梦，亡疾。四月。
(14) Crack making on the day of Gengchen, tested: with repeated nightmares, there might not be disaster. (HJ 17451)
庚辰卜，贞: 多鬼梦，不至囚。
(15a) Crack making on the day of Gengchen, tested: with repeated nightmares, the illness would be revealed.
庚辰卜，贞: 多鬼梦，𢀛疾见。
(15b) Tested: with repeated nightmares, the fault would be revealed.
贞: 多鬼梦，𢀛言 (愆) 见。
(15c) Tested: with repeated nightmares, □would be revealed. (HJ 17450)
贞: 多鬼梦，𢀛□见。(Fig. 4)

Oracle-bone inscriptions contain numerous references to "dream divination".[16] Among these, the term



Figure 4 HJ17450 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=127624)

"repeated nightmares" has two possible interpretations: one refers to "repeatedly dreaming of ghosts", while the other implies "dreaming of many ghosts". In the Yin-Shang worldview, nightmares were likely regarded as an indication of bodily illness. Analysis of the relationship between nightmares and illness in these inscriptions reveals two interpretations. In some instances, nightmares are seen as a symptom signaling the onset of illness, suggesting that the illness itself causes the nightmares. In other cases, nightmares are believed to directly cause illness. Therefore, nightmares and illness can be understood as having a mutually causal relationship.

2.2 Harm caused by parasites or malevolent forces

In addition to attributing illness to supernatural forces, the Shang people also explored the material causes of disease, developing a distinctive etiological concept of *Chong Gu* (虫蛊 harm by insects or demonic parasites). In oracle-bone inscriptions, the character  and , with consensus on its form and meaning, is deciphered as *Gu* (蛊, a legendary venomous insect). Observing the correlation between insect infestation and physical symptoms, the Shang people identified such phenomena as an independent source of illness.

(16a) Tested: The king [is afflicted]; it might be caused by *Gu*.
贞: 王，唯蛊。
(16b) Tested: The king [is afflicted]; it might not be caused by *Gu*. (HJ 201 front)

贞: 王，不唯蛊。
(17a) The illness in the teeth might be caused by *Gu*.
有疾齿唯蛊虐。
(17b) [The illness in the teeth] might not be caused by *Gu*. (HJ 13658)
不唯蛊。
(18) Tested: The illness in the teeth might be caused by *Gu*. (HJ 13664)
贞: 有<疾>齿不唯蛊。
(19a) Crack making on the day of Yiwei, tested: The king dreamed of *Gu*, which might bring disaster.
乙未卜，殼贞: 王梦蛊，唯囚。
(19b) Crack making on the day of Yiwei, tested: The king dreamed of *Gu*, which might not bring disaster. (HJ 1027 front)
乙未卜，殼贞: 王梦蛊，不唯囚。(Fig. 5)

These records suggest that afflictions caused by parasites or malevolent forces have long existed and are also referenced in classical texts. For example, in *Zuo Zhuan* (《左传》 *Zuo Qiuming's Commentary on Spring and Autumn Annals*), in the first year of Zhaogong (昭公 Duke Zhao), it states *Ji Ru Gu* (疾如蛊 illness like *Gu*), which Kong Yingda (孔颖达) interprets as "a disease that confuses the mind, similar to modern delusions or insanity, referred to as *Gu*".[17] Example (16) is a divination regarding the king's bone illness to determine if it was caused by *Gu*; Example (17) and (18) inquire whether dental ailments are due to *Gu*; in (19), the king dreams of *Gu* and wonders if this will lead to disaster.

This understanding reflects not only an intuitive grasp of natural phenomena, but also represents a proto-formulation of the traditional Chinese medical theory of *Liu Yin*—most notably the idea of *Feng Xie* (风邪 wind pathogen). The traditional form of the character *Feng* (风) contains the radical for insect, subtly embodying the pathological logic of "wind stirs, insects arise; insect aggregation leads to *Gu* affliction". This conceptual linkage laid an important ideological foundation for the development of external pathogenic etiology in TCM. Regarding other causes of illness, such as dietary factors suggested by some scholars, no corresponding evidence was found in the divination inscriptions.



Figure 5 HJ1027 front (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=110398)

3 The development of TCM's perspective in the etiology of oracle-bone inscriptions

The belief in divine intervention was one of the primary explanatory frameworks for disease among the Shang people. In their worldview, the *Shang Di*, ancestors, and various ghosts could all inflict illness upon humans, reflecting their profound reverence for and fear of supernatural forces. The Shang people believed that the *Shang Di*, as the highest divine authority, possessed ultimate authority and controlled human destiny, including health and illness. Ancestral spirits, regarded as family protectors, could also bring disease upon descendants as a form of retribution for disrespectful behavior or moral transgressions. This belief in spiritual causation left a lasting influence on later TCM theories, particularly in shaping concepts of disease causation.

3.1 Spiritual infliction: the origins of spiritual therapy and the doctrine of *Qi Qing* in TCM

In TCM theories, the importance of *Shen* (神 spirit) has always been emphasized. For instance, in *Huang Di Nei Jing·Su Wen·Yi Jing Bian Qi Lun Pian Di Shi San* (《黄帝内经·素问·移精变气论篇第十三》 *The Yellow Emperor's Inner Classic: Basic Questions: Chapter 13: Discourse on Moving the Essence and Changing the Qi*), it is stated that the effective diagnosis and treatment of diseases require the presence of *Shen*, as expressed in the phrase, "If one grasps the spirit, the patient will survive; if the spirit is lost, the patient will perish (得神者生，失神者死)".[18] Among the four diagnostic methods in TCM—inspection, listening and smelling, inquiry, and palpation—inspection, the highest form of diagnosis, underscores the principle of *Wang Er Zhi Zhi Wei Zhi Shen* (望而知之谓之神 to know by observation alone is called *Shen*).[19] Here, "*Shen*" does not refer to supernatural deities but rather to grasping the essence of illness, enabling precise diagnosis and treatment. However, the choice of the character "*Shen*" to describe the understanding of disease reveals a profound influence from the Shang-era belief in spiritual interference. The frequent appearance of the term "*Shen*" in traditional medical texts not only reflects its importance within TCM but also indicates how belief in spirits has remained deeply rooted and intertwined with the development of Chinese medical theory.

In TCM, the causes of disease are believed to encompass not only external pathogenic factors but also emotional and mental influences. The concept of "illness caused by the seven emotions" in TCM reflects this understanding; *Qi Qing* includes joy, anger, worry, contemplation, sadness, fear, and shock.[18] According to this

view, emotional imbalance can disrupt the harmony of qi and blood, leading to illness. This perspective parallels the Shang belief that spiritual forces could cause illness, as both emphasize the impact of non-material factors on health. Particularly in the diagnosis and treatment of mental disorders, the influence of spirit interference is deeply rooted in traditional Chinese medical beliefs. It was traditionally thought that mental illnesses were caused by malevolent spirits, and as such, treatments often involved methods to expel spirits and calm the mind. In many TCM texts, the concept of spirits and deities is closely related to emotional disorders. For example, in the Ming dynasty text *Zhen Jiu Da Cheng* (《针灸大成》*The Great Compendium of Acupuncture and Moxibustion*) by Yang Jizhou (杨继洲), it is stated that after being afflicted by malevolent spirits, individuals may exhibit symptoms such as "singing or laughing, crying or chanting, excessive talking or prolonged silence, frequent anger from morning to night, aimless wandering day and night, facial asymmetry, disheveled hair and bare feet, or even nudity".[20] These clinical manifestations bear a strong resemblance to emotional disorders in TCM. In the chapter *Gui Mei Hou* of *Zhu Bing Yuan Hou Lun* (《诸病源候论·鬼魅候》*Treatise on the Origins and Manifestations of Various Diseases: Ghost-induced Affliction*), it is recorded: "When a person is possessed by spirits, they tend to feel sorrowful, and their heart moves involuntarily. They may experience mental confusion as if intoxicated… The illness manifests as alternating chills and fever, a sensation of fullness in the chest and abdomen, shortness of breath, and an inability to eat or drink (凡人有为鬼物所魅，则好悲而心自动，或心乱如醉……病苦乍寒乍热，心腹满，短气，不能饮食)".[21]

Modern scholars such as Hu Huimin (胡会敏) and Su Li (苏莉), as well as Li Yong (李勇) et al.,[22] mentioned that due to the limitations of ancient medical conditions and people's understanding, most individuals believed that mental disorders and abnormal behaviors were caused by demonic possession. Chinese acupuncture even developed a specialized therapy known as the Thirteen Ghost Points (十三鬼穴). *Bei Ji Qian Jin Yao Fang Juan Shi Si Feng Dian Di Wu* (《备急千金要方卷十四·风癫第五》*Important Formulas Worth a Thousand Gold Pieces for Emergency, Volume 14: Wind Epilepsy, Part 5*) by Sun Simiao (孙思邈) recorded that "Bian Que said: 'For those afflicted by hundreds of evils, there are thirteen acupuncture points. For any needlework, first start from *Gui Gong* (鬼宫 the Palace of Ghosts), then needle the Ghost Letter, proceed to Ghost Rampart, and then to Ghost Heart; it is not necessary to needle all, five or six points are sufficient (百邪所病者，针有十三穴也，凡针之体，先从鬼宫起，次针鬼信，便至鬼垒，又至鬼心，未必须并针，止五六穴即可知矣)".[23] The "Ghost Points" in the Thirteen Ghost Points are thought to be the portal through which external malevolent qi (or "ghostly evils") can enter the human body. Naming this acupuncture technique the "Ghost Points" highlights its function in treating mental and emotional disorders. Traditional Chinese medicine posits that such disorders are often related to the influence of ghostly and evil spirits, with the "Ghost Points" seen as the pathway for these harmful qi to infiltrate the body. The treatment concept of the Thirteen Ghost Points is based on this understanding: by needling thirteen specific points, it aims to calm the mind and stabilize the spirit, making it highly effective for mental and emotional disorders. In modern times, research in clinical TCM has found that applying the "Thirteen Ghost Points" acupuncture technique can help alleviate hallucinations caused by Parkinson's medication and relieve severe depression.[24,25] The unique naming of the Thirteen Ghost Points and its application in treating such disorders reflects the deep influence of the Shang belief in spirit affliction on later Chinese medical practices. This belief not only persists as a cultural notion but also finds practical expression in diagnostic and therapeutic approaches, demonstrating the sustained presence and applied function of the spirit-affliction concept in TCM.

The Shang people believed that spiritual disturbances were a major cause of disease, and the corresponding treatment methods included prayer and supplication. This concept is closely related to the later traditional Chinese medical practice of *Zhu You Shu*, which focuses on expelling malevolent forces and restoring health through talismans, prayers, and rituals. It reflects a deep reverence for and reliance on supernatural forces. According to *Huang Di Nei Jing Su Wen Yi Jing Bian Qi Lun Pian Di Shi San*, "In ancient times, when people treated diseases, they simply moved the essence and changed the qi. They were able to invoke the origin, and the disease would end (古之治病，惟其移精变气，可祝由而已)".[18] Clearly, *Zhu You Shu* is regarded as an important treatment method. *Huang Di Nei Jing Ling Shu Zei Feng* (《黄帝内经·灵枢·贼风》*The Yellow Emperor's Inner Classic: The Spiritual Pivot: The Pathogenic Wind*) further explains its principle: "The sorcerers of former times, they knew how to overcome all diseases. When they knew the origin of a disease, they were able to perform an incantation and achieve a cure (先巫者，因知百病之胜，先知其病之所从生者，可祝而已也)".[26] This suggests that by identifying the root of illness (such as demonic influences) and performing rituals, healing could be achieved. Zhang Dengben (张登本) and Zhang Wuchun (张武春), in *Nei Jing Ci Dian* (《内经词典》*Dictionary of the Inner Classic*), define *Zhu You* as "a method of curing diseases and expelling illnesses through talismans, incantations, and verbal prayers".[27] Meanwhile, *Huang Di Nei Jing Su Wen Jiao Shi* (《黄帝内经素问校释》*Annotations on The Yellow Emperor's Inner Classic: Basic Questions*) states: "*Zhu You* was an ancient method of healing through prayers. In later generations, the practice of using talismans and incantations for disease prevention was classified as the

Zhu You discipline".[28] Wang Huaping (王华平)[29] and Gao Jing (高静)[30] have pointed out that the prevalence of *Zhu You Shu* was closely linked to the widespread belief in spirits and deities from the Shang dynasty to the pre-Qin period. The Shang people attributed diseases to the influence of spirits and thus used "prayers and blessings" as a means of treatment. This logic aligns closely with the fundamental principle of *Zhu You* therapy, which centers on "expelling spirits to cure diseases". Essentially, it seeks to restore health by communicating with deities or dispelling malevolent forces. This belief not only prevailed during the Shang period but also became deeply integrated into later Chinese medical theory and practice. In *Sheng Ji Zong Lu* (《圣济总录》*Comprehensive Recording of Divine Assistance*), compiled under the imperial commission of Emperor Huizong (宋徽宗) of the Song dynasty, a dedicated section titled *Fu Jin Men* (符禁门) was included, introducing and applying *Zhu You* therapy for treating diseases.[31] This reflected the enduring presence of supernatural beliefs in TCM, which were integrated into mainstream medical practice through methods such as *Zhu You*.

The records of "dream divination" in oracle-bone inscriptions are extensive, and in Shang beliefs, nightmares were thought to signify illness in the body. This relationship between dreams and illness is similarly reflected in TCM. According to *Huang Di Nei Jing Su Wen*: "When the yin qi abounds, one dreams of wading through a vast water, feeling fearful. When the yang qi abounds, one dreams of great fires burning. When both yin and yang qi are in excess, one dreams of mutual killings and harm. When the qi is abundant above, one dreams of flying. When the qi is abundant below, one dreams of falling. When one is overly full, one dreams of giving. When one is extremely hungry, one dreams of taking. When liver qi abounds, then one dreams of anger. When the lung qi abounds, then one dreams of weeping. When there are many short worms, then one dreams of crowds assembling. When there are many long worms, then one dreams of fights and mutual harming. (阴盛则梦涉大水恐惧，阳盛则梦大火燔灼，阴阳俱盛则梦相杀毁伤；上盛则梦飞，下盛则梦堕，甚饱则梦予，甚饥则梦取；肝气盛则梦怒，肺气盛则梦哭。短虫多则梦聚众，长虫多则梦相击毁伤)".[18] The records in *Huang Di Nei Jing* suggested that imbalances in the body's yin, yang, qi, and blood lead to variations in dream content. Regarding nightmares, *Shou Shi Bao Yuan* (《寿世保元》*Prolonging Life and Preserving the Origin*) stated, "When one experiences nightmares of death, it is due to a deficiency of vital spirit in daily life, causing restlessness during sleep and detachment of the soul from the body (凡夜梦魇死者，皆有平日神气不足，致使睡卧神不守舍，魂不依体)".[32] *Shen Jiu Jing Lun* (《神灸经纶》*Essentials of Divine Moxibustion*) recorded: "There are cases of nightmare attacks caused by ghosts, resulting from a disconnect between the heart and will. The heart houses the spirit, and the kidney houses the will. When a person sleeps, they draw qi into the kidney; if the kidney experiences fear, the essence retreats. This retreat causes the upper jiao (上焦) to close, leading to transformation of the liver's *Hun* (魂 ethereal soul) and the lung's *Po* (魄 corporeal soul) in myriad ways, manifesting as harmful nightmare attacks. Qi cannot rise, breathing is obstructed, and in severe cases, these attacks may occur several times in one night, especially in weak individuals and children (又有梦魇鬼击者，由于心志不交，心藏神肾藏志，人寐纳气于肾，肾有所恐，则精却，却则上焦闭，闭则肝之魂肺之魄化变百出，而为邪魇鬼击，气不得升，呼不得出，甚则一夜数发，虚人小儿多有之)".[33] These records indicated that the root cause of nightmares lies in physical imbalance, with illness as the cause and nightmares as the effect. The divinations in the oracle-bone inscriptions related to nightmares reveal that the Shang people recognized the occurrence of nightmares as a sign of potential underlying physical illness. This understanding aligns closely with later perspectives in TCM. The inscriptions related to nightmares and illnesses not only reflect the Shang people's reverence for spiritual forces but also demonstrate their careful observation and awareness of human health. By studying these ancient records on nightmares in oracle-bone inscriptions, we can better understand the formation and evolution of early medical thought and its profound influence on traditional Chinese medical theory.

In summary, the Shang people's belief in spiritual afflictions not only shaped their views on illness and medical practices but also, through the compilation and development by generations of physicians, gradually evolved into a systematic theory of TCM, exerting a profound influence on the development of TCM.

3.2 Insect and *Gu* infestation: the proto-theory of *Feng Xie* and external causes of diseases in TCM

The concept of illness caused by harmful insects and *Gu* poison was another explanation for disease among the Yin people. To them, certain ailments were thought to result from the influence of insect and *Gu* poisons. This belief likely originated from their observations of how different climates in the natural environment led to various illnesses. This understanding of disease causes also has profound implications in TCM. In Chinese medical theory, the concept of *Liu Yin Xie Qi* (六淫邪气 pathogenic qi of six excesses)—wind, coldness, summer-heat, dampness, dryness, and fire—highlights the impact of the natural environment on human health, with each of these influences considered a potential cause of disease. As natural phenomena, "wind" and "fire" were already recorded in oracle-bone inscriptions.

For instance:

(20) Tested: might this wind cause calamity?
贞：兹风不隹唯孽。(HJ 10131)(Fig. 6)



Figure 6 H10131 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=119773)

(21) Crack making on the day of *Xinhai*, tested: extinguish the fire, will the king receive blessings?
辛亥卜: 去火，王受佑。(HJ 28189)(Fig. 7)
(22) It is the fire that might bring disaster.
唯火有囚。(*Oracle-bones from the Southern Site of Xiaotun* 小屯南地甲骨4565)(Fig. 8)



Figure 7 H28189 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=138691)



Figure 8 Xiaotun4565 (source with permission from: https://jgw.aynu.edu.cn/home/zl/detail/index.html?id=249314)

"Wind" and "fire" could cause disasters, necessitating actions such as *Ning Feng* (宁风 calming the wind) and *Qu Huo* (去火 clearing pathogenic fire). However, it is still difficult to determine whether "wind" and "fire" in oracle-bone inscriptions are related to diseases or whether they have a direct connection with the concepts of "wind" and "fire" in the *Liu Yin*. In ancient understandings of nature, wind was closely associated with insects. *Da Dai Li Ji Yi Ben Ming* (《大戴礼记·易本命》*The Elder Dai's Records of Ritual: The Relationship between the Universe, Nature and Men*) stated that, "Two nines make eighteen; eight governs wind, and wind governs insects, hence insects transform in the eighth month (二九十八，八主风，风主虫，故虫八月化也)".[34] *Han Shu Wu Xing Zhi* (《汉书·五行志》*History of the Han Dynasty: Treatise on the Five Elements*) stated: "When it is warm and windy, armyworms (螟) breed in the fields, causing the disaster of bare insects (裸虫之孽) (温而风则生螟螣，有裸虫之孽)". It also said, "When the wind is mild and the temperature is warm, locusts (虫蝗) emerge and damage the five grains (厥风微而温，生虫蝗，害五谷)".[35] As recorded in *Shuo Wen Jie Zi* (《说文解字》*Elucidations of Script and Explications of Characters*): "Wind movement gives rise to insects (风动虫生)".[36]

Huang Di Nei Jing Su Wen, chapter 42 "On Wind" suggested that, "The wind is the chief (cause) of the one hundred diseases (故风者，百病之长也)",[18] meaning that among *Liu Xie*, wind has the most extensive range of related ailments, with complex and variable symptoms. Particularly in diagnosing and treating external diseases, TCM places special emphasis on the effects of wind as a significant pathogenic factor. The traditional character for "wind" is written as "風", which includes the component "虫 (insect)" , reflecting the ancients' concrete understanding of wind and their intuitive belief in wind's pathogenic mechanism—that "insects" or harmful agents might be present within the wind. This understanding extended to the idea that wind flow could spread disease, especially in the context of epidemics, as TCM associates epidemic outbreaks closely with the movement of wind. Gu Jihong (古继红) pointed out that wind can facilitate the large-scale transmission of respiratory diseases by carrying aerosol particles containing viruses[37]. The pathogens suspended in aerosols resemble the concept of "insects in the wind" in ancient discourse.

Although *Huang Di Nei Jing* does not explicitly equate "insects (虫)" with viruses, its *Qu Xiang Bi Lei* (取象比类 analogical thinking) abstracts bacteria, viruses, and other pathogens into the symbolic representation of "insects". This insight touches on the essence of epidemic transmission: Wind, as a medium, spreads pathogens through its movement and diffusion, leading to the spread of disease. This aligns with modern medical findings, which indicate that pathogens responsible for epidemics can spread widely through "airborne transmission". The integration of this character structure and

concept makes the understanding of Wind's pathogenic influence more vivid and concrete in TCM. Such notions highlight the influence of the ancient belief in harmful "insect" or "poison" agents on the formation of traditional medical concepts of disease causation. In addition, the concept of "*Gu* poison" in TCM is thoroughly documented in *Jing Yue Quan Shu* [《景岳全书》*The Complete Works of (Zhang) Jingyue*], covering various methods such as medicinal formulas, techniques for dispelling *Gu*, and incantations to break its effects.[38] These ancient beliefs, refined and developed by generations of medical scholars, gradually shaped a systematic theory in TCM, providing a foundational framework and guidance for its advancement.

4 Conclusion

The oracle-bone inscriptions on medical ailments reveal the cognitive framework of disease etiology during the Shang dynasty, providing an important foundation for the formation of traditional Chinese medical theory. The Shang people attributed the causes of disease to "spiritual disturbances" and "harm caused by insects and *Gu* poison". The former included illnesses inflicted by the *Shang Di*, afflictions caused by ancestral deities, and diseases induced by nightmares. The latter may have originated from their understanding of witchcraft and observations of natural pest infestations. These concepts profoundly influenced the later development of disease etiology in traditional Chinese medicine. The belief in spiritual disturbances aligns with TCM theories and treatments such as illness caused by emotional imbalance (seven emotions), *Zhu You* therapy, and the Thirteen Ghost Points acupuncture technique. Meanwhile, the recognition of harm caused by insects and *Gu* poison was incorporated into TCM's theory of external pathogenic factors through concepts like "wind as the chief of all diseases" and "six excesses causing illness". Additionally, the oracle-bone inscriptions that associate nightmares with disease resonate with *Huang Di Nei Jing*'s discussion of dreams caused by yin-yang imbalances, reflecting an intellectual transition in ancient medicine from mysticism toward natural observation.

The Shang concept of disease causation laid the foundation for the holistic view in TCM, emphasizing the principles of correspondence between heaven and humans (天人相应) and the unity of body and spirit (形神合一). However, current research still has limitations. First, the interpretation of oracle-bone inscriptions related to medicine and disease relies on close collaboration between paleography and TCM, yet interdisciplinary cooperation remains insufficient[1]. Second, the historical evolution of concepts such as spiritual disturbances and harm from insects and *Gu* poison has yet to be fully clarified. Comparative studies integrating excavated medical texts—such as the Mawangdui (马王堆) and Zhangjiashan (张家山) Han bamboo slips—are needed to trace the inheritance and innovation of medical thought from the pre-Qin period to the Han and Tang dynasties. In the future, by synthesizing oracle-bone inscriptions, excavated manuscripts, and classical medical texts, scholars can further trace the origins of TCM's etiology and reconstruct its trajectory from the integration of shamanic and medical practices to a more rational and systematic framework. Only by bridging ancient and modern perspectives and incorporating interdisciplinary approaches can we fully uncover the historical foundations and cultural characteristics of TCM theory.

Notes

1. The term *Shang Di* (上帝) appears in the oracle-bone inscriptions of the Shang dynasty, referring to the supreme deity, which differs from the concept of God in current Christianity.
2. Most of the oracle-bone inscriptions are cited according to *Jia Gu Wen He Ji* (《甲骨文合集》*Collection of Oracle-bone Inscriptions*), "HJ" refers to the *He Ji* numbering system. Some of the inscriptions are cited according to *Xiao Tun Nan Di Jia Gu* (《小屯南地甲骨》*Oracle-bones from the Southern Site of Xiaotun*).

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The authors declare no financial or other conflicts of interest.

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Imperial Power and Medicine: Ingot and Its Equipment Made by Qing Palace during Yongzheng Period

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Abstract

This study aims to explore the Qing court's emphasis on traditional Chinese medicine (TCM) culture and technology, as well as the role of ingots as a carrier of imperial medical culture. By systematically sorting out the types, quantities, and shapes of medicinal ingots recorded in *Huo Ji Dang* (活计档 Archives of Imperial Workshops) during the 13-year Yongzheng reign, and by combining these records with existing ingot-related molds, physical specimens, and other collections in the Palace Museum, this research finds that: the Yongzheng Emperor incorporated ingots into the production list of the Imperial Workshop and established standardized preparation procedures, making them a technical practice for displaying imperial power; the fixed system of rewarding ingots during the Dragon Boat Festival turned ingots into a product of Manchu-Han cultural integration and formed a custom; the evolution of ingot equipment was dynamically related to military activities in the mid-Qing dynasty, confirming its function in court politics; and the integration of the preparation and packaging process of ingots into the power operation system, and transforming TCM-related knowledge and technology into means of exercising power, constructed a materialized path for imperial power to regulate the bureaucratic system and social order. The conclusion reveals the inherent logic of the Qing court: establishing authoritative identity through material culture.

Keywords: Yongzheng period; Medicinal ingot; Imperial power; Traditional Chinese medicine

1 Introduction

This paper, based on previous studies, systematically examines the records related to the production institutions, time, types, quantities, shapes, and packaging of ingots in the *Qing Gong Nei Wu Fu Zao Ban Chu Dang An Zong Hui* (《清宫内务府造办处档案总汇》 *Compendium of Archives of the Qing Palace Imperial Workshops*) [hereinafter referred to as *Huo Ji Dang* (活计档)], and combines these with the existing molds and physical specimens of ingots in the Palace Museum for verification. Particularly, it discusses how a traditional Chinese medicine (TCM) dosage form became a medium of interaction between imperial power and TCM knowledge. On one hand, this interaction promoted the development of several aspects of TCM. On the other hand, medicine also became a tool for the emperor to regulate medical knowledge to some extent. In addition, focusing on the Qing Palace ingots, which involve both TCM culture and broader Chinese traditional culture, the relationship between knowledge and power is explored as well.

Ingots with solid dosage forms are made by grinding medicines into fine powders and adding appropriate adhesives to take shape, which can be used both internally and externally.[1] For internal use, they can be swallowed directly or ground into powder and taken with water or yellow rice wine; for external use, they can be ground into powder and applied with water or vinegar. This unique dosage form of TCM has been widely used since the Song and Yuan dynasties due to its flexible usage, and its clear and significant therapeutic effects have led to its extensive use in various social contexts since the Ming and Qing dynasties.[2] Since the founding of the People's Republic of China, ingots were included in the first edition of the *Zhong Guo Yao Dian* (《中国药典》 *Chinese Pharmacopoeia*) (1963), and they have been listed as an independent dosage form in the general rules of the *Zhong Guo Yao Dian* (1990).

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The earliest study on Qing Palace ingots was conducted by Guan Xuelin (关雪玲).[3] Based on archival records and relevant historical documents, as well as the cultural relics in the Palace Museum, she explored the names, production, and uses of Qing Palace ingots. She pointed out that Qing Palace ingots are not a specific name for a certain Chinese patent medicine, but a general term for various medicines with the main function of preventing summer heat stroke and epidemic diseases. Rewarding ministers with imperial medicines as a means of emotional connection was a common political practice for Qing emperors, but only the reward of ingots became an annual tradition, usually around the Dragon Boat Festival. In addition, she specifically discussed the functions of ingots as rewards. For example, due to the meticulous craftsmanship and exquisitely detailed designs, both the givers and the recipients of the rewards regarded ingots as not only medicinal products but also exquisite handicrafts symbolizing royal honor. Zhang Xueyu (张学渝) mentioned the institutions and conditions for ingot production in his study on the Qing Palace Imperial Workshops,[4–5] and also discussed the shapes of ingots on the basis of the "Qing Palace Medical Cultural Relics Exhibition" held by the Palace Museum in February 2021.[6] Cheng et al. discussed the English translation of traditional Chinese medicine prescriptions.[7] Liu Shixun (刘世珣) discussed how ingots were instrumentalized within the political networks of the Qing dynasty.[8] In addition, we have examined the origins of the name and functional evolution of ingots.[9]

Although plenty of studies have been conducted on Qing Palace ingots, which have attracted public attention, the interpretation of their multiple values is still insufficient. As a unique material and cultural carrier in the history of the Chinese pharmaceutical industry, Qing Palace ingots have undergone systematic reshaping under the intervention of imperial power: from the preparation process and shape design to packaging standards, which turns them into a unique paradigm that integrates the practicality and aesthetic appeal of medicine. This imperial medicine essentially constitutes the material expression of the operation of power, with its form and circulation system carrying the deep logic of palace governance. However, in existing research, the material culture and political symbols behind ingots have not been thoroughly explored, especially from the perspective of knowledge-power, so that the deep cultural logic of the technology-politics complex has not yet been systematically deconstructed.

2 Origins of ingots in the imperial palace

Our research group's previous studies have proven that the predecessor of ingot medicine was the "straight substance" in the medical literature of the Han and Tang dynasties. Later, it underwent an evolution from external use in the Han and Tang dynasties to internal and external use in the Song and Yuan dynasties. Its formal stabilization and naming were deeply influenced by the monetization of silver (the promotion of silver ingots helped shape its final naming). The therapeutic scope gradually expanded from constipation, ear diseases, eye diseases, etc., to include the treatment of various diseases such as water and soil disorders, nausea and vomiting, and carbuncles, swelling, and toxins. Due to its variable shape, easy portability, and derived functions as gifts, it was also recorded as military equipment in historical records for a period of time. The royal attention to it stems not only from its clear clinical utility (especially its suitability for palace and military contexts), but also from its versatile design that can carry multiple functions of political gifts and power symbols, becoming a typical carrier that integrates medicine, economy, and political culture.

In feudal times, rewarding subjects with gifts was an important means for emperors to win them over and express imperial power. The royal gifts in the past were often gold and silver objects,[10] and medicines as gifts were rare, with the earliest records dating back to the Tang and Song dynasties.[11–12] However, medicines, being more practical than money or objects for health, could better reflect the emperor's care and control over the recipients.[13] The production of ingots in the imperial court could be traced back to the Ming dynasty. According to Jiang Yikui's (蒋一葵) *Chang An Ke Hua* (《长安客话》 *Beijing Conversations*) after 1594, "The Imperial Medical Bureau would send officials to Haizi to catch toads and extract their juice to make medicine, specifically the Zijin ingot (太医院例于端阳日差官至海子，捕虾蟆挤酥以合药，制紫金锭)".[14] By the Wanli period (1573–1620), there were records of rewarding ministers with imperial ingots. *Ming Shen Zong Xian Huang Di Shi Lu Zhi San Shi Ba* (《明神宗显皇帝实录卷之三十八》 *The Veritable Records of Emperor Shenzong of Ming: Vol. 38*) recorded that "The Emperor rewarded Grand Secretary Zhang Juzheng with 20 packages of Zijin ingots, Lyu Tiaoyang with half that amount, and the lecture officials such as Ding Shiming with even less (上御文华殿讲读赐辅臣张居正紫金锭药二十封，吕调阳半之，讲官丁士美等又半之)".[15] This indicates that Zijin ingots were already used as imperial gifts during the Wanli period, with the quantity related to the ranks of the recipients.[16] Manchu rulers of the Qing dynasty had had a tradition of rewarding their subordinates since the pre-Qing period.[17] Statistics show that ingots were among the most widely produced Chinese patent medicines in the Qing Palace, with the majority of the rewards occurring around the Dragon Boat Festival, and they were bestowed far more frequently than other medicines.[18] (Fig. 1)

In summary, the production and rewarding of ingots in the imperial court originated in the Ming dynasty and were further developed and widely applied during the



Figure 1 Ba Bao Tai Zi Jin ingot (八宝太乙紫金锭), Collection Number: 故00172486 (source with permission from: The Palace Museum)

Qing dynasty, becoming one of the most extensively produced medicinal products by the Imperial Workshops. Due to their portability, diverse designs, and medical value, ingots were of great medical, historical, and artistic significance, with their power attributes surpassing their medicinal properties.

3 Production of ingots under imperial power

Since Beijing became the capital of the Qing dynasty, the Imperial Workshop was one of the core institutions of the Imperial Household Department (内务府). After the Yongzheng Emperor ascended the throne, many workshops were added and various reforms were carried out, such as the archival preservation of the work done by each workshop.[19] Therefore, the present study mainly focuses on archival records across the thirteen years of Yongzheng's reign. Through sorting out relevant archives and carefully examining the changes in types, shapes, and packaging, we found that during this period, the influence of imperial power on ingots was reflected not only in decision-making and production, but also in processing methods, design innovation, packaging, transportation, etc.[20] These ingots containing political and cultural meanings were gradually regarded as the embodiment of royal authority and rewards. When these ingots were awarded and spread, they further served the political purpose of the Qing dynasty, thus consolidating its governance. The preparation of ingots and the improvement of their packaging during the gradual standardization process demonstrate the development and changes of a certain technological item in the interaction of power and knowledge.

3.1 Institutions and timing for the preparation of ingots

According to the records in *Huo Ji Dang*, during the reign of the Yongzheng Emperor, the imperial edicts for the preparation of ingots were documented in the records of eight workshops, including: *Ding Zi Zuo/Ding Zi Yao Zuo* (锭子作/锭子药作 Ingot Workshop/Ingot Medicine Workshop). Since the terms "Ingot Workshop" and "Ingot Medicine Workshop" frequently appear alternately in the archives, it can be inferred that they both refer to the same workshop specifically responsible for producing ingots. The earliest records of these workshops appeared in the second year of Yongzheng's reign. In addition to these workshops, craftsmen from other workshops, such as tailors, silk weavers, and bead crafters, were often temporarily assigned to collaborate with the Imperial Medical Bureau and the Imperial Pharmacy (御药房) in the preparation of ingots.[21]

During the Yongzheng period, the records of ingot preparation before the Dragon Boat Festival for annual use accounted for approximately 80% of all records. The Qing dynasty partially inherited the institutional frameworks of the Ming Dynasty, including the medical system. During the Ming Dynasty, it was already a convention in the inner court to produce ingots around the Dragon Boat Festival. Wang Shizhen (王士祯), in his *Ju Yi Lu* (《居易录》*Records of Living in Ease*) written during Shunzhi and Kangxi reigns, recorded that "Today, at the Dragon Boat Festival, eunuchs still sell the internally-made Zijin ingots at the Duanmen Gate, which is a legacy of the old system (今端阳节，中官犹于端门鬻内造紫金锭，是其遗制也)".[22] This indicates that the tradition of making ingots during the Dragon Boat Festival had already existed in the imperial palace before Yongzheng's reign, and it was likely a continuation of the practice of the Ming dynasty.

Rewarding subjects was an important means of appeasement adopted by the Qing dynasty emperors, following the rulers of previous dynasties in the governance and administration. Since the prevention and avoidance of epidemics was always an important component of Dragon Boat Festival customs, the Yongzheng Emperor chose to intensively reward ingots during this festival celebrated by both Manchus and Han Chinese. This practice not only promoted the nationwide implementation of epidemic prevention policies but also facilitated the integration of Manchu and Han cultures through the TCM knowledge. The emperor's authority endowed him with the legitimacy to reshape and dominate Han culture,[23] thereby enhancing the dissemination of TCM knowledge related to the prevention of summer heat stroke, epidemic diseases, and foul qi. Therefore, it can be argued that in this context, the preparation and rewarding of ingots in the imperial court were products of the integration of Manchu and Han cultures. This practice, which started and flourished during the Yongzheng Emperor's reign, became customary and had a lasting impact on later generations.

3.2 Types of ingots

Ulcers and sores had always been the most prevalent diseases in the field of surgery. The ingots prepared by

the Imperial Workshops include Zijin ingot (紫金锭), Chansu ingot (蟾酥锭), Ligong ingot (离宫锭), Yanshui ingot (盐水锭), Dahuang ingot (大黄锭) [including Dahuang fan device (大黄扇器), Dahuang tablet (大黄牌子), Dahuang fan pendant (大黄扇坠)], Qinhua ingot (噙化锭), Heat-Prevention Fragrant Bead (避暑香珠), and Chuanjiao ingot (川椒锭). Among them, four of these preparations—Zijin ingot, Chansu ingot, Ligong ingot, and Yanshui ingot—are commonly used in the treatment of emergencies such as ulcers and sores, and are recorded in a wide range of Chinese medical literature. The efficacy of different types of ingots produced by the Qing Imperial Workshops is shown in Table 1.

Qing Palace's decision to use these four types of ingots as a fixed combination may be a continuation of practices of the Ming dynasty, but it also indicates that the efficacy of these medicines has been tested for a long time. The three medicines, Dahuang ingot, Qinghua ingot, and Chuanjiao ingot, have prescription names but no recorded compositions in the archives of the Imperial Workshop of the Qing dynasty. The three prescription names have not been found in ancient books. Through the published formula versions of various Qing imperial hospitals and other medical literature, it was found that there are records of Jiawei Wuhuang ingot, Qinghua Pill, and Guijiao ingot. The correlation between these and the ingots recorded in *Huo Ji Dang* needs to be verified. In addition, Heat-Prevention Fragrant Bead is the only prescription with both the name and composition in *Huo Ji Dang*, but the prescription with the same name or composition has not been found in other medical literature. Whether this prescription is only used in the palace or there are other sources or evolution of the prescription remains to be verified.

In terms of the composition and dosage of ingots, only the detailed information of Zijin ingot, Chansu ingot, and Heat-Prevention Fragrant Bead has been found in the files of the 11th year of Yongzheng era. Taking Zijin ingot as an example, we compared its composition and dosage between the Yongzheng and Guangxu periods through calculations. It was found that over time, the medicine composition of Zijin ingot did not change, but the dosage of some drugs in it showed a downward trend, especially the three traditional Chinese medicines of musk, realgar, and cinnabar with strong medicinal properties and certain toxic side effects. We speculate that this decrease in quantity may be related to the evolving prescribing habits of imperial physicians during the clinical process, or the tendency of being cautious and conservative in medicine use on duty. It may also be related to economic costs, such as the precious Chinese medicinal herbs like musk, the large consumption of which will inevitably increase the burden on the palace. Further analysis is needed to focus on the correlation of power with efficacies, feedbacks, and other related factors in ingot rewarding during the Yongzheng period.

3.3 Shapes of ingots

Traditional Chinese culture emphasizes the unity of principle and form. The Yongzheng Emperor, who was exposed to Confucian, Buddhist, and Taoist traditions from a young age, believed "the unity of Three Teachings (三教合一), and they should not be distinguished based on superficial differences or actions".[26] During his 13-year reign, ingots were produced in 13 different shapes, which not only satisfied his aesthetic preferences but also reflected the therapeutic indications of the medicines—ingots with clear therapeutic effects were often paired with shapes carrying specific cultural connotations—and embodied the cultural values of Confucianism, Taoism, and Buddhism. Table 2 below summarizes the 13 shapes recorded in the archives:

Fan Pendant (扇器): Since the Song dynasty, scholars were fond of using fan pendants as decorative items. The earliest record of using ingots such as Zijin ingot as fan pendants can be traced back to the early Qing dynasty in Liu Tingji's (刘廷玑) *Zai Yuan Za Zhi* (《在园杂志》 *Zaiyuan Miscellany*), which records: "Recently, there have been fragrant ingots made of osmanthus, as well as Yushu Dan and Zijin ingot (近有合香桂花制成以及玉枢丹、紫金锭)".[27] During the Dragon Boat Festival, the Yongzheng Emperor often awarded fans

Table 1 The efficacy of different types of ingots

Types of Ingots	Efficacy	Notes
Zijin ingot (紫金锭)	Treatment of abscesses, boils, and acute stroke[25]	First recorded in *Wai Ke Jing Yao* (《外科精要》 *Essentials of External Medicine*) (1263, Song); same formula as *Shen Xian Jie Du Wan Bing Wan* (神仙解毒万病丸 Immortal's All-Curing Detoxification Pill), with minor dosage changes[23,24]
Chansu ingot (蟾酥锭)	Treatment of fish umbilical ulcers	First recorded in *Pu Ji Fang* (《普济方》 *Prescriptions for Universal Relief*) (1406, Ming)[25]
Ligong ingot (离宫锭)	Detoxification; dispersal of blood stasis; alleviation of swelling and pain; treatment of sores and toxic swellings without suppuration	First recorded in *Wai Ke Da Cheng* (《外科大成》 *Great Compendium of External Medicine*) (1665, Qing)
Yanshui ingot (盐水锭)	Treatment of pruritic lumps, oral sores, styes, and eye inflammation; external use for wound repair; oral use to clear heat, detoxify, and relieve pain	First recorded in *Liang Peng Hui Ji Jing Yan Liang Fang* (《良朋汇集经验神方》 *Divine Recipes Collected from Kindred Friends' Experiences*) (1711, Qing)

Table 2 Thirteen shapes of ingots recorded in the archives

	Shape	Original Ingot	Cultural Connotation
1	Fan Pendant (扇器)	Dahuang ingot, Heat-Prevention Fragrant Bead, Chuanjiao ingot	Confucian Culture
2	Tablet (Dahuang Tablet, Black Tablet, Red Tablet) [牌子(大黄牌子，黑牌子，红牌子)]	Dahuang ingot, Chansu ingot	Confucian Culture
3	Garlic (蒜头)	Chansu ingot	Confucian Culture
4	Gourd (葫芦)	Chansu ingot	Confucian Culture
5	Tai Chi Diagram (太极图)	Chansu ingot, Yanshui ingot	Taoist Culture
6	Taoist Master (天师)	Chansu ingot	Taoist Culture
7	Eighteen Arhats Rosary (十八罗汉数珠)	Heat-Prevention Fragrant Bead	Buddhist Culture
8	Canopy (帐锭)	Chansu ingot	Emphasizing artistic aesthetics, manifesting the cultural accomplishment of the emperor
9	Button (钮子)	Chansu ingot	
10	Color-painted Pendant (彩画吊挂)	Zijin ingot	
11	Plain Pendant (素吊挂)	Zijin ingot	
12	Color-painted ingot (彩画锭子)	Zijin ingot	
13	Plain ingot (素锭子)	Zijin ingot	

to his ministers, along with ingots made from Dahuang ingot, Heat-Prevention Fragrant Bead, and Chuanjiao ingot as fan pendants.

Tablet (牌子): During the Ming and Qing dynasties, it was common for the wealthy and the officials to wear fragrant tablets to strengthen the body, ward off evil, and maintain health.[28] The types of ingots made into tablets during the Yongzheng period included Dahuang ingot and Chansu ingot. These tablets were usually molded directly. In the Palace Museum, there is a wooden mold for Taiyi Zijin ingot, indicating that Zijin ingot was also made into tablets, although it is unclear whether this mold was made during the Yongzheng period.

Eighteen Arhats Rosary (十八罗汉数珠): The Yongzheng Emperor had a keen interest in Buddhist scriptures from a young age and often engaged in discussions with monks.[29] At that time, Confucianism was taken as the orthodox ideology to govern the subjects. Therefore, although Buddhism was acknowledged by the Yongzheng Emperor, he did not incorporate it into his political governance.[30] However, he did not conceal his fondness for Buddhist items. Starting from the first year of his reign, he repeatedly ordered the Imperial Workshops to produce the Qing Palace Summer-avoiding Pearl in the shape of the Eighteen Arhats Rosary.[31]

Shapes of Taoist Master (天师), Garlic (蒜头), Gourd (葫芦), and Tai Chi Diagram (太极图): These shapes, which were commonly seen during the Dragon Boat Festival in Chinese history, were all made from Chansu ingots. The archives also recorded special red-copper "Five Poisons" lids, which were embedded on Chansu ingots, suggesting that these lids might have replaced colored paintings on the ingots.[31] *Chan Su* (蟾酥 toad venom), one of the "Five Poisons", has the therapeutic effects of promoting blood circulation, detoxifying, preventing heatstroke and foul air, and relieving insect bites. This design emphasized the cultural connotations of "Dragon Boat Festival", "May Poisons", and "warding off evil", aligning with both Manchu and Han traditional customs. It also highlighted the therapeutic effects of Chansu ingot in preventing epidemics and repelling insects, showcasing the integration of TCM and Chinese culture.

Zhang ingot (帐锭): ingots with the shape of canopy are quite unique among the Qing inner court ingots. In *Huo Ji Dang*, it was recorded in the 10th year of Yongzheng's reign as follows: "On the sixth day, the official Manpi conveyed the order to prepare the annual ingots (handed over to the Ingot Workshop bearer Su Ermai) ... 40 batches of Chansu ingots, 2 pairs of 8-liang Zhang ingots, 2 pairs of 7-liang Zhang ingots, 2 pairs of 6-liang Zhang ingots, 4 pairs of 5-liang Zhang ingots, 4 pairs of 4-liang Zhang ingots, 4 pairs of 3-liang Zhang ingots, and 4 pairs of 2-liang Zhang ingots [初六日员外郎满毗传做年例傍 (交锭子药作栢唐阿蘸尔迈) …… 蟾酥锭40料，8两帐锭2对，7两帐锭2对，6两帐锭2对，5两帐锭4对，4两帐锭4对，3两帐锭4对，2两帐锭4对]".[32]

We speculate that Zhang ingots were of different sizes, which were related to weight, and they were produced and used in pairs. Apart from the records in the Imperial Workshops, no other literature has been found mentioning Zhang ingots. A search in the digital archives of the Palace Museum also revealed no physical specimens. The exact usage of Zhang ingots—whether they were hung on curtains like medicine pouches or placed in specific locations within the bed canopy—remains to be further explored.

Niuzi (钮子): In the colloquial language of the Qing dynasty, this term often referred to a button on clothing. This particular shape of ingot was only recorded once in the archives of the Imperial Workshops.[20] Although no physical specimen has been found, the name suggests that

it resembles a button. Whether it had a hole in the middle to mimic a real button, or was used as a decorative button on clothing, remains to be further investigated.

Color-painted ingot (彩画锭), Plain ingot (素锭): These two types, recorded in the Imperial Workshops during the Yongzheng period, specifically referred to the shapes of Zijin ingot. Some were painted with colors, while others were designed as pendants with tassels. On March 1st of the 9th year of Yongzheng's reign, there was a record of tailors attaching tassels to ingots.[20] As shown in Fig. 2.

3.4 Tools for ingot production

The ingots with diverse and unique shapes require specific tools for their production. According to the archives, in the fifth year of Yongzheng's reign, the Copper Workshop was ordered to prepare copper molds and copper needles for ingots.[33] We speculate that the copper molds were used for shaping ingots, and might also have been related to the red-copper "Five Poisons" lids mentioned in the archives related to Chansu ingot. The copper needles were likely used to pierce holes in the ingots for threading tassels, which were a common decorative element. For example, the purchase records in the eleventh year of Yongzheng's reign documented the acquisition of threads and tassels for making color-painted Zijin ingot pendants and other items.[34] (Fig. 3) Guan Xuelin suggested that "two copper molds" could be interpreted as "two sets of copper molds", with each set containing multiple molds of different shapes.[3]



Figure 2 Inlaid Mother-of-Pearl Rectangular Zijin ingot Pendant (嵌螺钿长方形紫金锭佩), Collection Number: 故00249231-4/5 (source with permission from: The Palace Museum)



Figure 3 Wooden Rectangular Mold for Taiyi Zijin ingot (太乙紫金锭), Collection Number: 故00172660 (source with permission from: The Palace Museum)

After being molded, ingots enter the artistic processing stage.[35] The archives from the eleventh year of Yongzheng's reign detailed the painting tools and pigments used for decorating ingots, including 20 white sanded trays, 4 white soup bowls, 10 eyebrow brushes, and 10 outline brushes. We compared the pigments listed in the archives with those mentioned in *Hong Lou Meng* (《红楼梦》*The Story of the Stone*) (completed in the early Qing dynasty), considering readability and consistency in modern terminology , as shown in Table 3:

From the table above, it can be seen that the pigments recorded in *Huo Ji Dang* are not significantly different from those in *Hong Lou Meng*. The commonly used pigments include cinnabar, ochre, realgar, azurite, malachite, gamboge, indigo, and rouge. Gold leaf is used in both the sources. However, *Hong Lou Meng* only mentions red gold leaf, while the Imperial Workshops used red gold leaf, yellow gold leaf, and fish roe gold leaf, indicating a more diverse range. Lapis lazuli is mentioned in *Hong Lou Meng* but not used by the Imperial Workshop. Additionally, it was found that the white pigment used in *Hong Lou Meng*. is clam powder, while the Imperial Workshops used rice powder. Both *Huo Ji Dang* and *Hong Lou Meng*. select alum as a pigment fixative and donkey-hide gelatin as a binder. However, as recorded in *Huo Ji Dang*, fish bladder glue, a more precious binder made from fish bladders, was used by the Imperial Workshops.

Zao Ban Chu (造办处) was responsible for the production of various items.[36] The whole process involved issuing a decree by the emperor, resubmitting, approving, and manufacturing.[37] A single ingot needed to go through multiple procedures such as mold shaping, painting, perforation, and tasseling. Through cross collaboration of the workshops, the will of the emperor is reflected through the entire production chain, and the supervision of imperial power standardizes this series of procedures, thus forming a standardized operating procedure (SOP) for the preparation of Qing Palace ingots. The Yongzheng Emperor's aesthetic views and advocacy

Table 3 Comparison of pigments between *Hong Lou Meng* and *Huo Ji Dang*

Pigment	Quantity in *Hong Lou Meng*	Quantity in *Huo Ji Dang* (March 3rd, 11th year of Yongzheng's reign)	Quantity in *Huoji Files* (March 28th, 11th year of Yongzheng's reign)
Cinnabar (朱砂)	4 liang (4两)	2 liang (2两)	2 liang (2两)
Ochre (赭石)	4 liang (4两)	1 liang (1两)	1 liang (1两)
Realgar (雄黄)	4 liang (4两)	2 liang (2两)	2 liang (2两)
Azurite (石青)	4 liang (4两)	8 liang (8两)	8 liang (8两)
Malachite (石绿)	4 liang (4两)	6 liang (6两)	8 liang (8两)
Gamboge (藤黄)	4 liang (4两)	1 liang (1两)	1 liang (1两)
Indigo (青黛)	8 liang (8两)	2 liang (2两)	2 liang (2两)
Rouge (胭脂)	10 pieces (10片)	1 sheet (1张)	
Lapis Lazuli (青金)	200 patches (200贴)		
Red Gold Leaf (赤飞金)	200 patches	325 sheets (325张)	325 sheets (325张)
Yellow Gold Leaf (黄飞金)		325 sheets (325张)	325 sheets (325张)
Fish Roe Gold Leaf (鱼子金)		175 sheets (175张)	175 sheets (175张)

to a certain extent reshaped and expanded the use of ingots prepared from TCM. During his thirteen years in power, eight types of ingots were produced, with a total of 13 forms. Ancient Chinese society attached great importance to education, regarding it as the main factor shaping people's thoughts and social atmosphere. During the Dragon Boat Festival, the emperor intensively awarded ingots, which incorporate the elements of Confucianism, Buddhism, and Taoism, with the purpose of epidemic prevention and health care. This was conducive to maintaining traditional customs of the Dragon Boat Festival, leading the trend with the knowledge of TCM, and strengthening control over grassroots society. The symbol transformation of ingot shape carries specific political functions. For example, Chansu ingot can strengthen the epidemic prevention effect with the Dragon Boat Festival elements of the Han people, such as Taoist Master, Taiji Diagram, etc.; the Heat-Prevention Fragrant Bead was transformed into the shape of Eighteen Arhats Rosary, thereby acquiring Buddhist connotations. When such ingots incorporating the symbols of the three religions enter the bureaucratic system and frontier military camps as Dragon Boat Festival gifts, their exquisite craftsmanship (such as the application of fish bladder glue and various gold foil) establishes aesthetic authority, prompting meritorious families to imitate while strictly adhering to the boundaries of ranks. This practice of transforming medical knowledge into cultural power not only promotes the dissemination of TCM, but also strengthens social control through the ruling logic of "consolidating the governance by uniting the internal and external world".

4 Evolution and standardization of packaging and storage tools for ingots

During the reign of the Yongzheng Emperor, the Qing dynasty continuously fought against the Junggar in the northwest. The evolution of the shape of ingot equipment showed a significant correlation with this military background. According to *Huo Ji Dang*, the equipment design not only ensured the hygiene of medicine storage and the security of medicine transportation, but also constructed a system of power symbolism through size, quantity, and material. When such equipment containing imperial ingots was awarded to frontier soldiers, its material carrier not only enabled cross-space medicine delivery but also became a spiritual symbol of imperial power at the frontiers of military affairs. The archives show that during the thirteen years of Yongzheng's reign, the form of equipment was continuously adjusted. This dynamic evolution was essentially a projection of military politics onto material culture.

Sachets (香袋): Sachets were used in the Yongzheng period to directly store the prepared ingots. According to *Huo Ji Dang*, in the first year of Yongzheng's reign, when he ordered the workshops to produce ingots, he also required the making of various types of sachets, including yellow silk sachets with paintings on both sides, round yellow silk sachets with paintings, yellow silk sachets embroidered with the Five Poisons, multicolored silk sachets with auspicious patterns, and sachets for rewards ("令做鹅黄素缎两面写画长方香袋、鹅黄素缎两面写画圆香袋、鹅黄素缎绣五毒香带、五色绒缠福儿香袋、五色素缎绣五毒香袋以及赏用香袋").[38] The records of making ingot sachets can also be found in the seventh, eleventh, and twelfth years of Yongzheng's reign.

Holding Boxes (捧盒): These boxes, large in size and without handles or knobs, can only be held and moved by both hands. According to *Huo Ji Dang*, holding boxes were ordered to be made along with ingots in the fifth and sixth years of Yongzheng's reign,[31,33] but no further records of their production have been found. It is speculated that Yongzheng used holding boxes to keep ingots

for a certain period but later discontinued their use for unknown reasons.

Wrapping Cloths (挖单): Wrapping cloths are fabrics used to wrap items. The production of these cloths is frequently documented in *Huo Ji Dang* together with the orders for ingots and holding boxes. The terminology for wrapping cloths in the archives was not standardized, with variations such as yellow fine wrapping cloth, yellow wrapping cloth, ingot wrapping cloth, and square wrapping cloth. Common sizes included a square of five *fu* (1 *fu* ≈ 33.3 cm) or a square of two and a half *fu*, with units typically recorded as "piece" or "item". In the fifth year of Yongzheng's reign, there is a record of "fourteen yellow fine wrapping cloths for ingot holding boxes".[33] Hence, it can be inferred that these wrapping cloths were initially used along with holding boxes. Although no later records of holding box production have been found in the archives, the practice of using wrapping cloths as containers for ingots was retained, with records of their production in the tenth, eleventh, and twelfth years of Yongzheng's reign.

Ingot Boxes (锭子药匣): The containers most frequently used and produced for ingots in the archives of Imperial Workshops were ingot boxes. Starting from the third year of Yongzheng's reign, the Box Workshop began to make dedicated boxes for storing ingots according to imperial orders. These boxes were categorized into three sizes: large, medium, and small. *Huo Ji Dang* provides specific dimensions for these boxes: "All boxes were papered in yellow on the outside and in red on the inside, measuring seven *cun* (22.4 cm) in length, five *cun* and eight *fen* (21.28 cm) in width, and two *cun* and seven *fen* (11.36 cm) in height (俱糊黄纸面红纸里，各长七寸、宽五寸八分、高二寸七分)". In the ninth and eleventh years of Yongzheng's reign, the archives also recorded five types of ingot boxes named after their contents: Zijin ingot Pendant Box, Color-painted Zijin ingot Box, Chansu ingot Box, Tai Chi Diagram Yanshui ingot Box, and Chuanjiao ingot Box.

Yellow Notice Paper (黄榜纸): Yellow Notice Paper was used along with ingot boxes and was typically measured in sheets. A record from the fourth year of Yongzheng's reign states that: "the Box Workshop made a large number of ingot boxes with Yellow Notice Paper".[33] The archives from the ninth and eleventh years also detailed the types, quantities, and prices of paper used for making boxes such as Zijin ingot Pendant Boxes and Color-painted Zijin ingot Boxes.[20,34]

Cedar Wood Trays (杉木盘子): Cedar wood trays were used for holding ingots and were later referred to simply as "cypress trays papered in yellow(糊黄纸盘子)". In the tenth year of Yongzheng's reign, a record states: "an order to produce ten cedar wood trays papered in yellow for holding ingots (令做盛放锭子药的糊黄纸杉木盘子十个)".[20] As a medicine produced in the imperial palace, ingots were paired with specialized utensils to emphasize hygiene, ensure safety and efficacy, and demonstrate royal dignity.

Wooden Boxes (木匣): Wooden boxes, also referred to as cypress wood boxes or cypress wood chests, were used to store ingot boxes and other royal rewards, essentially serving as "transport boxes". A record from the seventh year of Yongzheng's reign states: "Wrap these boxes and fans with paper, make two wooden boxes to hold them, line the inside of the box with yellow paper, use black felt for the inner and outer layers, and pad the boxes with cotton to stabilize them (将此匣子、扇，用纸包裹，做木匣二个盛装，匣内糊黄纸，做黑毡里黑毡外套，用棉花塞垫稳，钦此)".[31] Throughout *Huo Ji Dang*, although the Yongzheng Emperor often delegated the preparation of ingots to others, such as "order Prince Yi to allocate funds from the Guangchu Treasury" or "order officials such as Shen Yu and Tang Yingfu to prepare annual celebrations", the production of wooden boxes was always directly ordered by Yongzheng himself with simple and clear instructions: "Make boxes from cypress wood, paper the surface in yellow, line the inside and outside with black felt, and pad the box with cotton to stabilize the contents (令杉木做匣，匣面糊黄纸，匣里外都用黑色毛毡，并塞上棉花以垫稳)". These wooden boxes were primarily intended to ensure the safety and integrity of items during long-distance transportation, which functioned similarly to modern packing cases. Their design and color scheme—yellow, red, and black—highlighted royal dignity and reflected Yongzheng's meticulous attention to detail.

In the first year of Yongzheng's reign, ingot sachets were the most common form of packaging. After the fourth year of Yongzheng's reign, the packaging system gradually became more elaborate and standardized. Ingot boxes were not only produced but also subdivided into large, medium, and small sizes according to their capacity. The rewarding of ingots was likely related to the official position and military achievements of the recipients. It is speculated that during this period, the Qing Palace had already started preparing military supplies for the northwestern frontier.[39] Ingots thus served both as symbols of monarch–subject unity and as essential materials in prewar military preparations. During the Qing-Junggar war, records in *Huo Ji Dang* about the packaging of ingots were further expanded, with derivative products such as Yellow Notice Paper, Wrapping Cloths, and Cedar Wood Trays appearing. Given the remoteness and transportation difficulties of the western battlefield, the Qing Palace also specially produced cedar boxes to ensure the safety and integrity of ingots during the long-distance transport. Throughout this process, equipment requirements for the ingots were clear and specific, and the color scheme (yellow, red, and black) was strictly followed to demonstrate royal authority. This fully reflected the Yongzheng Emperor's meticulous style of governance. Some scholars have noted that in the fifth year of Yongzheng's reign, the Imperial

Workshops were ordered to begin large-scale weapon production under the supervision of Prince Yi (怡亲王) in preparation for military operations against the Junggar.[40] We argue that the evolution of ingot equipment—from simplicity to complexity and from routine production to specialized tailoring since the fifth year of Yongzheng's reign—was closely coordinated with, and developed synchronously alongside, military operations on the northwestern frontier.

5 Conclusion

During the Qing dynasty, society was relatively stable, and the preparation of traditional Chinese medicine entered a period of prosperity. Influenced by the idea of "being a good prime minister or being a good doctor (不为良相当为良医)", scholars systematically compiled a large number of effective prescriptions; based on the development of agriculture and technology, the cultivation of medicinal herbs was promoted; and the surge in the number of medicine merchants ensured the circulation of medicinal materials. All these factors provided a stable foundation for ingot production to reach its peak during the Yongzheng period. Ingots were mainly used to dispel heat, detoxify, and ward off impurities (in traditional Chinese medicine, these functions are often associated with seasonal and solar-term changes), so the timing of imperial bestowal was relatively fixed. The Dragon Boat Festival (also known as "Poisonous May") has a tradition of epidemic prevention and filth avoidance in the Manchu and Han cultures. The Yongzheng Emperor took this opportunity to show respect to the Han culture and consolidate the legitimacy of his rule. Thus, he institutionalized ingots as an annual imperial reward for the Dragon Boat Festival, transforming them into a unique means of exercising imperial authority. This practice vividly reflects the relationship between medical knowledge and political power.

In the Qing dynasty, when imperial authority was paramount, the will of the Yongzheng Emperor had a decisive influence on the production of ingots. His attention extended far beyond the therapeutic efficacy of the medicines themselves, delving into details such as the production process, design, packaging, and transportation. As a result, ingots became an integral component of a highly regulated system of power ritual, in both content and form. To him, power was no longer manifested through violence in rituals, but standardization, habitual practice, and disciplinary mechanisms. The imperial power, with ingots as the carrier, demonstrates its dominance over medical knowledge by controlling their production process. At the same time, when preparing for the northwest military supplies, Yongzheng had already considered the rewarding connotation of medicine and gradually improved the equipment for ingots, incorporating the reward planning into military operations.

Thus, ingots—surpassing their role as ordinary traditional Chinese medicine formulations—became an intermediary for imperial intervention in medical technology during a specific historical period. It is a symbol of the emperor's exercise of power, extending control over the bureaucratic system and, by extension, court and society. In summary, under the blessing of imperial power, ingots were no longer just a medicine but a tool for extending power. Together with their shapes (artistic forms and changes) and the cultural connotations, they symbolized a form of care, education, and control over the subjects. The specialization and proceduralization of production institutions turned ingots into a tool for domination. In fact, not only the medicine but also the specific cultural customs and festivals (such as the Dragon Boat Festival) were brought into the political field, endowed with the connotations of power hierarchy. With the permeation of imperial power, the forms of ingots became more diversified, leading to richer content of TCM knowledge. Thus, ingots gained a special status in the "power-technology" chain.

As a traditional Chinese medicine formulation, ingot medicine continues to be applied and developed in specific contexts today. Representative ingots retained and produced domestically include *Pian Zai Huang* (片仔癀) from Zhangzhou (漳州), Fujian (福建), and Boyun ingot (拨云锭) from Chuxiong (楚雄), Yunnan (云南), both of which maintain a certain production scale and market recognition. In terms of craftsmanship inheritance, the production techniques of ingot medicine have been included in the protection system of intangible cultural heritage. Notably, the national intangible cultural heritage "Boyun Ingot Production Techniques (拨云锭制作技艺)" and the Chifeng City (赤峰市) intangible cultural heritage "Traditional Chinese Medicine Ingot Production Techniques [Li Gong Ingot (离宫锭)]" have been continued through the practice of inheritors and traditional Chinese medicine exhibition activities.

With the revival of traditional culture, the cultural and gift attributes of ingot medicine have become increasingly prominent, giving rise to cultural and creative products that combine medicinal and ornamental value. For example, the Palace Museum and the Chinese Academy of Traditional Chinese Medicine have launched cultural and creative works inspired by traditional ingot medicine, promoting its transformation from medical supplies into cultural symbols, as shown in Fig. 4.

At the same time, modern scientific research on ingot medicine continues to advance. Classic formulas such as Zijin ingot and Heat-Prevention Fragrant Bead are being adapted to modern contexts through dosage-form optimization and mechanism-based research. On the one hand, emerging technologies such as electrospinning are employed to improve medicine delivery systems; on the other hand, computer-aided medicine design is used to explore their therapeutic potential for contemporary diseases. These developments indicate that, while



Figure 4 Modern ingot handicrafts (source with permission from: photo taken by the author)

preserving traditional craftsmanship, ingot medicine is increasingly integrated into modern health practices and the broader development framework of traditional Chinese medicine through cultural innovation and scientific research.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

LI Haotian contributed to the original draft and to the study's conceptualization. LIU Yanjun contributed to writing—review and editing, project administration, and conceptualization.

Conflicts of interest

The authors declare no financial or other conflicts of interest.

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View on Life: The Mechanism of Traditional Chinese Medicine in Treating Lung Diseases by Treating the Large Intestine

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Abstract

The disruption of gut microbiota and excessive immune responses are commonly observed in various respiratory conditions, including Corona virus disease 2019 (COVID-19). As supported by the theories of "treating the lung diseases from the large intestine (从肠治肺)" and "simultaneous treatment of lung and large intestine (肺肠同治)", TCM (traditional Chinese medicine) has made significant contributions to the management of pneumonia, acute respiratory distress syndrome (ARDS), chronic obstructive pulmonary disease (COPD), asthma, and other respiratory conditions, demonstrating remarkable clinical effectiveness. Thus, our review sought to investigate the underlying material basis and scientific implications of this theory, specifically focusing on the regulation of gut microbiota, thus providing new ideas for clinical treatment. We reviewed the therapeutic efficacy of TCM in treating lung diseases using the "treating the lung diseases from the large intestine" and "simultaneous treatment of lung and large intestine" methods. The mechanisms of action (MOAs) of TCM were also summarized. TCM can protect the abundance and inhibit the translocation of intestinal microbiota caused by lung diseases, exhibiting significant anti-inflammatory roles, etc. Additionally, TCM can regulate metabolic process, e.g., promoting the production of anti-inflammatory short-chain fatty acids (SCFAs). Meanwhile, Gut microbiota might be an important regulatory target for the therapeutic role of TCM to treat lung diseases.

Keywords: Traditional Chinese medicine; Gut microbiota; Pneumonia; COVID-19; Chronic obstructive pulmonary disease; Acute respiratory distress syndrome

1 Theory basis of "treating the lung diseases by treating the large intestine (从肠治肺)" in traditional Chinese medicine

Huang Di Nei Jing (《黄帝内经》 *The Yellow Emperor's Inner Classic*), as the earliest extant and relatively complete medical classic in China, discusses the relationship between the lung and the large intestine. During this period, traditional Chinese medicine (TCM) utilized the meridian theory to explain that the lung meridian is connected to the large intestine, thereby influencing its functions. For instance, *Ling Shu Jing Mai* (《灵枢·经脉》*The Spiritual Pivot: The Conduit Vessels*) states: "The pathway of the hand Taiyin lung meridian... import into the Yangming large intestine meridian (肺手太阴之脉，起于中焦，下络大肠)". *Ling Shu Ben Shu* [《灵枢·本输》*The Spiritual Pivot: To Consider the Transportation (Openings) as the Foundation*] further elaborates: "The lung is paired with the large intestine (肺合大肠)". If the lung is affected by disease, the large intestine may also be impaired. For instance, *Su Wen Ke Lun* (《素问·咳论》*Basic Questions: Coughing*) mentions: "If lung cough persists, the large intestine will be affected, and the symptom of large intestine cough is coughing with fecal incontinence (肺咳不已，则大肠受之，大肠咳状，咳而遗矢)". Although the functional connection between the lung and the large intestine is not explicitly stated, various passages collectively suggest a functional relationship between these two organs. For instance, *Su Wen Jing Mai Bie Lun Pian* (《素问·经脉别论篇》*Basic Questions: Further Discourse on the Conduit Vessels*) notes: "Fluids enter the stomach... ascend to the lungs, and the lungs regulate the water passages... (饮入于胃……上归于肺，

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通调水道……)". *Ling Shu Ying Wei Sheng Hui Pian* [《灵枢·营卫生会篇》*The Spiritual pivot: Camp (Qi) and Guard (Qi) Generation and Meeting*] mentions that "the large intestine governs the *yin* fluids (大肠主津)".

By the Han dynasty, *Shang Han Lun Bian Yang Ming Bing Mai Zheng Bing Zhi Fa* (《伤寒论·辨阳明病脉证并治法》*Treatise on Cold Damage: Differentiation of Yangming Disease Pulse Patterns and Treatment Methods*) utilized the lung-large intestine relationship to treat diseases. For example, it states: "For those with wheezing and an inability to lie down due to dry stools, *Da Cheng Qi Tang* (Major Purgative Decoction) is appropriate (喘冒不能卧者，有燥屎也。宜大承气汤)". *Jin Gui Yao Lue Tan Yin Ke Sou Bing Mai Zheng Bing Zhi Pian* (《金匮要略·痰饮咳嗽病脉证并治篇》*Essentials from the Golden Cabinet*) also notes: "Coughing with rebellious qi and panting, shortness of breath that prevents lying down, with a swollen appearance, is called thoracic fluid retention... For thoracic fluid retention with chest fullness, use *Hou Po Da Huang Tang* (厚朴大黄汤 Officinal Magnolia Bark Rhubarb Decoction) (咳逆倚息，短气不得卧，其形如肿，谓之支饮…支饮胸满者，厚朴大黄汤主之)", indicating that physicians began to realize that we can treat the large intestine to treat the lung disease.

During the Tang and Song dynasties, physicians further elaborated on the mutual influence between the lung and the large intestine. *Huang Di Nei Jing Ling Shu Ji Zhu Juan Wu* (《黄帝内经灵枢集注·卷五》*Variorum of Spiritual Pivot and Basic Questions: Volume 5*) states: "The large intestine is the *Fu*-organ of the lung and governs bowel movement. When evil qi obstructs the large intestine, it can lead to upward rebellion, causing wheezing. Thus, diseases of the large intestine can also ascend and affect the lung (大肠为肺之腑而主大便，邪痹于大肠，故上则为气喘争。故大肠之病，亦能上逆而反遗于肺)". Consequently, treatments that address both the lung and the large intestine emerged. For example, *Bei Ji Qian Jin Yao Fang* (《备急千金要方》*Important Formulas Worth a Thousand Gold Pieces for Emergency*) prescribes: "For cases where both the lung and the large intestine are in excess, leading to a sensation of qi fullness, use *Zhu San Tang*… (治肺与大肠俱实，令人气凭满，煮散方.....)", and "For cases where both the lung and the large intestine are deficient... use *Xiao Jian Zhong Tang* (小建中汤 Minor Center-fortifying Decoction) (治肺与大肠俱不足……小建中汤方)".

By the Ming and Qing dynasties, many medical texts provided further explanations based on this theory, indicating that the relationship between the lung and the large intestine had become a consensus. For instance, *Su Ling Wei Yun Ye Ge Jie* (《素灵微蕴·噎膈解》*The Profound Meaning in Basic Questions and Spiritual Pivot: Treatise on Dysphagia-occlusion*) further elaborates: "The lung and the large intestine share a qi relationship. When lung qi transforms essence and nourishes the large intestine, the intestines become smooth, and bowel movements are facilitated (肺与大肠，表里同气，肺气化津，滋灌大肠，则肠滑而便易)".

In *Wen Bing Tiao Bian Feng Wen Zhong Jiao Pian* (《温病条辨·风温中焦篇》*Systematic Differentiation of Warm Diseases: Wind-Warmth Middle Energizer Disease Pattern*), the first decoction that simultaneously treats the lung and the intestine has appeared: "Wheezing, restlessness, and copious phlegm, with an excess pulse at the right cun and failure of lung qi to descend, use *Xuan Bai Cheng Qi Tang* (White Purgative Decoction) (喘促不宁，痰涎壅滞，右寸实大，肺气不降者，宣白承气汤主之)". In addition, a number of ancient decoctions that apply the theory of "the exterior-interior relationship between the lung and the large intestine (肺与大肠相表里)" can be seen in Table 1.

2 Treatment of lung diseases by treating the large intestine

After delving into the origins of the theory regarding the exterior-interior relationship between the lung and the large intestine, we have discovered that this ancient concept in TCM not only has profound historical roots but also demonstrates unique value in contemporary clinical practice. Following the outbreak of Corona virus disease 2019 (COVID-19), caused by the infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), there has been increasing attention on the clinical application of "treating the lung diseases by treating the large intestine (从肠治肺)". Many studies have shown that the gut microbiota can act directly on the replication lifecycle of SARS-CoV-2, or indirectly by influencing the immune response, subsequently affecting the outcome of viral infection.[1]

Not limited to pneumonia, we have found that TCM utilizing the theory of "treating the lung diseases by treating the large intestine" is also highly effective in treating other lung diseases, particularly during acute exacerbations. This approach has shown promise in managing critical conditions such as acute respiratory distress syndrome (ARDS), chronic obstructive pulmonary disease (COPD), and asthma. Proper application of this method during acute episodes can reduce the rate of disease progression to severe stages, lower mortality rates, and shorten hospital stays. In chronic disease management, it can also alleviate symptoms more quickly, halt disease progression, and prevent further deterioration.

2.1 Pneumonia

Generally speaking, pneumonia refers to the infectious inflammation of distal airways, alveoli, and pulmonary interstitial that results from the infection of bacteria, viruses, and/or other pathogenic microorganisms.

TCM doctors believe that the fundamental etiology and pathogenesis of pneumonia involves the deficiency

Table 1 **Classic prescriptions that apply the theory of the exterior-interior relationship between the lung and the large intestine**

Prescription	Theory	Classic	Relevant Literature
Da Cheng Qi Tang (大承气汤 Major Purgative Decoction)	Treating the lung diseases by treating the large intestine (从肠治肺)	*Shang Han Lun Bian Tai Yang Bing Mai Zheng Bing Zhi Fa* (《伤寒论·辨太阳病脉证并治法》 *Treatise on Cold Damage: Differentiation of Taiyang Disease Pulse Patterns and Treatment Methods*)	"For those with wheezing and an inability to lie down due to dry stool, *Da Cheng Qi Tang* is appropriate (喘冒不能卧者，有燥屎也。宜大承气汤)"
Ge Gen Qin Lian Tang (葛根芩连汤 Pueraria and Coptis Decoction)		*Shang Han Lun Bian Tai Yang Bing Mai Zheng Bing Zhi Fa*	"If a doctor erroneously uses purgation, leading to incessant diarrhea, and the pulse is rapid, it indicates that the exterior syndrome has not been resolved. For cases with wheezing and sweating, use *Ge Gen Qin Lian Tang* (医反下之，利遂不止，脉促者，表未解也，喘而汗出者，葛根黄芩黄连汤主之)"
Hou Po Da Huang Tang (厚朴大黄汤 Officinal Magnolia Bark Rhubarb Decoction)		*Jin Gui Yao Lue Tan Yin Ke Sou Bing Mai Zheng Bing Zhi Pian* (《金匮要略·痰饮咳嗽病脉证并治篇》 *Synopsis of Prescriptions of the Golden Chamber: Diagnosis, Syndromes and Treatment of Phlegm Retention and Cough*)	"Coughing with rebellious qi and panting, shortness of breath that prevents lying down, with a swollen appearance, is called thoracic fluid retention... For thoracic fluid retention with chest fullness, use *Hou Po Da Huang Tang* (咳逆倚息，短气不得卧，其形如肿，谓之支饮……支饮胸满者，厚朴大黄汤主之)"
Shi Zao Tang (十枣汤 Ten Jujubes Decoction)		*Jin Gui Yao Lue Tan Yin Ke Sou Bing Mai Zheng Bing Zhi Pian* (《金匮要略·痰饮咳嗽病脉证并治篇》 *Essentials from the Golden Cabinet: D iagnosis, Syndromes and Treatment of Phlegm Retention and Cough*)	"After drinking, if water flows and accumulates below the rib area, coughing and paining, this is called pleural fluid retention... For the disease of pleural fluid retention, use *Shi Zao Tang* (饮后水流在胁下，咳唾引痛，谓之悬饮……病悬饮者，十枣汤主之)"
Xuan Bai Cheng Qi Tang (宣白承气汤 Lung-dispersing Purgative Decoction)	Simultaneous treatment of the lung and the large intestine (肺肠同治)	*Wen Bing Tiao Bian Feng Wen Zhong Jiao Pian* (《温病条辨·风温中焦篇》 *Systematic Differentiation of Warm Diseases: Wind-Warmth Middle Energizer Disease Pattern*)	"Wheezing, restlessness, and copious phlegm, with excess pulse at the right cun and failure of lung qi to descend, use *Xuan Bai Cheng Qi Tang* (喘促不宁，痰涎壅滞，右寸实大，肺气不降者，宣白承气汤主之)"
Jie Geng Bai San (桔梗白散 Platycodon White Powder)		*Jin Gui Yao Lue Fei Wei Fei Yong Ke Sou Shang Qi Bing Mai Zheng Zhi Di Qi* (《金匮要略·肺痿肺痈咳嗽上气病脉证治第七》 *Essentials from the Golden Cabinet: Volume 7 of Diagnosis and Treatment of Lung Atrophy, Abscess, Cough, and Qi Rising*)	"*Jie Geng Bai San*: Treat cough with chest fullness, chills, rapid pulse, dry throat without thirst, occasional expectoration of foul-smelling, turbid sputum, and prolonged purulent sputum resembling rice porridge, indicating lung abscess (桔梗白散：治咳而胸满振寒，脉数，咽干不渴，时出浊唾腥臭，久久吐脓如米粥者，为肺痈)"
Xiao Jian Zhong Tang (小建中汤 Minor Center-fortifying Decoction)		*Bei Ji Qian Jin Yao Fang* (《备急千金要方》 *Important Formulas Worth a Thousand Gold Pieces for Emergency*)	"For cases where both the lung and the large intestine are deficient... use *Xiao Jian Zhong Tang* (治肺与大肠俱不足……小建中汤方)"
Zhu San Tang (煮散方 Decocted Powder Formula)		*Bei Ji Qian Jin Yao Fang*	"For cases where both the lung and the large intestine are in excess, leading to a sensation of qi fullness, use *Zhu San Tang*… (治肺与大肠俱实，令人气凭满，煮散方……)"

of healthy qi (正气) combined with the invasion of external pathogenic qi (邪气), which impairs the dispersing function of the lung. The initial site of pneumonia is in the lung, but it can easily affect the five zang organs. Ye Tianshi (叶天士) of the Qing dynasty, in his *Wen Re Lun* (《温热论》 *Treatise on Warm-heat Diseases*) pointed out that "Pathogenic warmth ascends and first attacks the lung (温邪上受，首先犯肺)". Additionally, Zhang

Jingyue (张景岳) of the Ming dynasty, in *Lei Jing Juan Shi Si* (《类经·卷十四》*Classified Classic: Volume 14*), proposed that "The lung disease connects to the kidney disease, as qi sinks to the lower part, and mother passing illness to child (肺病连肾，以气陷下部而母病及子也)", meaning that lung diseases can impair the functions of the kidney. He Mengyao (何梦瑶) of the Qing dynasty, in *Yi Bian Za Zheng* (《医碥·杂症》*Medical Ladder: Miscellaneous Diseases*) stated that "The spleen earth generates the lung metal, and the lung benefits from the spleen (是为脾土生肺金，是肺受脾之益)". When the lung fails to disperse and descend, child's illness can affect the mother, which may also impact the functions of the spleen and stomach. Therefore, to minimize damage to the five *Zang*-organs and protect the vital qi as early as possible, in the theory of treatment for pneumonia based on the large intestine, the usage of *Tong Fu* method (通腑法), which directly translates to "clear/dredge *Fu* (清/通腑)" with *Cheng Qi Tang* (承气汤) is commonly used. In general, the early application of purging *Fu* (泻腑) will help preserve healthy qi and improve therapeutic outcomes in patients with excess patterns of disease.

For example, it is recommended that children with mycoplasma pneumonia be treated with orally administrated *Huo Tan Tong Luo Fang* (豁痰通络方 Phlegm-dispersing and Meridian-soothing Formula) combined with the external application of *Da Huang* (大黄 *Radix et Rhizoma* Rhei) and *Xuan Ming* powder (玄明粉).[2] Compared to conventional Western medicine, this combined method achieves better clinical outcomes in alleviating fever and cough.

In patients with severe pneumonia, the usage of different kinds of *Cheng Qi* formulas, such as Modified *Xuan Bai Cheng Qi Tang* (加味宣白承气汤 Modified Lung-dispersing Purgative Decoction)[3] and *Tiao Wei Cheng Qi Tang* (调胃承气汤 Stomach-regulating Purgative Decoction),[4] can also shorten the length of hospitalization and improve patient prognosis. Moreover, the combination of *Xuan Bai Cheng Qi Tang* with conventional Western medicine[5] also achieves satisfactory treatment outcomes by reducing the levels of inflammatory factors, regulating the gut ecosystem, and accelerating recovery while shortening the course of the disease. Additionally, the combination of *Da Cheng Qi Tang* in the form of retention enema and acupuncture treatment[6] has been found to shorten the duration of Intensive Care Unit (ICU) stays and improve the gastrointestinal function of patients with severe pneumonia.

For COVID-19, *Xiao Cheng Qi Tang* and other modified *Cheng Qi* decoctions have been demonstrated to have satisfactory effects in treating fever, dry cough, and diarrhea.[7] The usage of Modified *Xuan Bai Cheng Qi Tang* can also facilitate the recovery of both the large intestine and the lung simultaneously, thus interrupting the progression and reducing the severity of COVID-19 cases, resulting in a reduced mortality rate.[8]

2.2 Acute respiratory distress syndrome

Severe pneumonia can rapidly develop into acute respiratory distress syndrome (ARDS), which can further progress into multiple organ dysfunction syndrome (MODS). Although TCM does not have a specific disease name for ARDS, its symptoms can be categorized as an acute episode of dyspnea (喘病). *Yi Zong Jin Jian Ding Zheng Jin Gui Yao Lue Zhu Zang Fu Jing Luo Xian Hou Bing Mai Zheng Di Yi* (《医宗金鉴订正金匮要略注·脏腑经络先后病脉证第一》*Revised Golden Mirror of the Medicine, Annotations on the ynopsis of Prescriptions of the Golden Chamber: Volume 1 of the Treatise on the Pathology and Pulse Diagnosis of Viscera, Bowels, and Channels in Sequential Order*) records: "Breathing with an open mouth, unable to sustain breath, resembling panting but without shoulder lifting, is a disease of shortness of breath. This is due to evil qi accumulating in the lung, causing panting, while insufficient vital lung qi leads to shortness of breath (呼吸张口，不能续息，似喘而不抬肩者，短气病也。盖肺气壅满，邪有余之喘也，肺气不续息，正不足之短气也)". This describes the symptoms and pathogenesis of ARDS. Regarding the complex pathogenesis of ARDS, *Sheng Ji Zong Lu Fei Qi Chuan Ji Men* (《圣济总录·肺气喘急门》*Complete Record of Sacred Benevolence: Pulmonary Panting*) provides a detailed account: "Pulmonary panting arise from qi deficiency of lung and kidney... Deficiency below and excess above cause the qi pathway to become rushed and constrained, the lung lobes to rise, and the upper jiao to become obstructed, resulting in panting and an inability to lie down (肺气喘急者，肺肾气虚……下虚上实，则气道奔迫。肺叶高举，上焦不通，故喘急不得安卧)". This indicates that ARDS is often a mixed pattern of deficiency and excess. The deficiency primarily involves qi deficiency of the lung and kidney, while the main excess is phlegm, fluid or stasis congesting the lung.

ARDS is a dangerous and potentially fatal respiratory failure syndrome caused by infection, trauma, and other factors both inside and outside of the lungs. The main pathogenesis of ARDS involves the leakage of fluid from the small pulmonary blood vessels into the tiny, elastic air sacs (alveoli) where oxygen exchange takes place. During the progression of ARDS, the imbalanced inflammatory response is the critical etiologic factor, therefore providing us with a good target for intervention.

Compared to conventional treatment in Western medicine, TCM prescriptions have been reported to have better therapeutic effects with fewer adverse effects. For example, *Xuan Fei Tiao Chang Tang* (宣肺调肠汤 Lung-dispersing Intestine-regulating Decoction) can improve the clinical arterial blood gas index, decrease inflammatory response, and shorten cumulative mechanical ventilation time, thereby improving lung function.[9] There is also evidence to show that *Xuan Bai Cheng Qi Tang* can reduce the levels of tumor necrosis factor α (TNF-α) and

interleukin 1β (IL-1β) while increasing that of interleukin 10 (IL-10), resulting in a significant improvement in lung function.[10] More studies have shown that formulas with the actions of simultaneously treating the lung and large intestine, such as *Tong Fu Xie Fei Tang* (通腑泻肺汤 Viscera-unblocking Lung-draining Decoction),[11] *Tiao Qi Li Shui Tang* (调气利水汤 Qi-regulating Water-draining Decoction),[12] and *Xuan Fei Tiao Chang Tang*,[9] can significantly reduce the secretion of proinflammatory mediators. The Modified *Tong Fu Xie Fei Tang* has also been reported to shorten the duration of mechanical ventilation and ICU stay.[13]

2.3 Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is a chronic obstructive airway disease characterized by irreversible airway restriction and persistent respiratory symptoms. Its clinical symptoms mainly include dyspnea, chronic cough with phlegm, and are often accompanied by other respiratory diseases.[14]

There is no specific record of the disease name "COPD" in TCM. However, based on the symptoms and characteristics of COPD, it can be classified under the category of lung distension (肺胀). *Ling Shu Zhang Lun* (《灵枢·胀论》 *The Spiritual Pivot*: *Discussion of Distension*) mentions, "Lung distension is characterized by lung deficiency, fluid retention, and resultant panting and coughing (肺胀者,虚满而喘咳)". From the perspective of TCM doctors, it is believed to be caused by qi deficiency combined with the invasion of external evil qi, resulting in the stagnation of blood and phlegm. For example, *Zhu Bing Yuan Hou Lun Ke Ni Duan Qi Hou* (《诸病源候论·咳逆短气候》 *Treatise on the Origins and Manifestations of Various Diseases: Syndrome of Coughing, Panting, and Shortness of Breath*) states: "When lung qi is injured by mild cold, it leads to coughing. Coughing causes qi to return to the lung space, resulting in lung distension. Lung distension causes qi to rebel, and it is further invaded by pathogenic factors... thus leading to coughing, panting, and shortness of breath (肺气为微寒所伤则咳嗽，咳则气还于肺间则肺胀，肺胀则气逆，复为邪所乘……故咳逆短气也)". This suggests that lung distension (肺胀) is caused by the failure of the lung to disperse and descend (肺失宣肃), combined with invasion by external pathogens. On the other hand, *Dan Xi Xin Fa Ke Sou* (《丹溪心法·咳嗽》 *Danxi's Experiential Therapy: Coughing*) states: "Lung distension is caused by phlegm combined with blood stasis obstructing qi… leading to lung distention (肺胀者……此痰挟瘀血阻碍气而病)". This perspective attributes the condition to the obstruction of qi by blood stasis (瘀血) and phlegm retention (痰饮).

TCM can treat COPD by targeting the large intestine, and it has been shown to produce comparable or even better results than conventional treatment. For instance, *Xuan Bai Da Cheng Qi Tang* (宣白大承气汤 Lung-dispersing Major Purgative Decoction) prescribed in the form of a retention enema can reduce the occurrence of COPD complications, such as fever, infection, vomiting, and respiratory failure.[15] Treatment of COPD using *Xuan Bai Cheng Qi Tang* combined with Western medicine also has certain advantages in clinical efficacy, blood gas analysis, and lung function when compared to Western medicine alone. More specifically, this combined treatment method can increase pulmonary ventilation and reduce $PaCO_2$, thereby improving oxygenation while reducing adverse reactions caused by mechanical ventilation. Its main mechanism of action involves the increased amplitude of chest muscle movements and the recovery of respiratory function in COPD patients.[16] In addition, the combined treatment can also strengthen gastrointestinal peristalsis, promote defecation, and subsequently, reduce abdominal pressure. Furthermore, compared to conventional treatment, *Xin Jia Xuan Bai Cheng Qi Tang* (新加宣白承气汤 Lung-dispersing Purgative Decoction with Additions) significantly reduced the clinical symptoms of acute exacerbation in COPD patients. More specifically, the combination of *Xin Jia Xuan Bai Cheng Qi Tang* with conventional medicine showed superior effects compared to conventional medicine alone in alleviating dyspnea, excessive phlegm, abdominal distension, constipation, and other symptoms.[17]

2.4 Asthma

Asthma is a very common chronic respiratory disease that manifests as the narrowing and swelling of the airways. This condition leads to difficulty in breathing, coughing, wheezing, or shortness of breath.[18]

Since ancient times, TCM has recognized and documented asthma as *Xiao Bing* (哮病 which translates to wheezing disorder/disease). As early as in *Su Wen Yin Yang Bie Lun* (《素问·阴阳别论》 *Basic Questions: Further Discourse on Yin and Yang*), it is mentioned that "fumigation of the lung causes panting and wheezing (熏肺，使人喘鸣)". In *Jin Gui Yao Lue Fei Wei Fei Yong Ke Sou Shang Qi Bing Mai Zheng Zhi Di Qi* (《金匮要略·肺痿肺痈咳嗽上气病脉证治第七》 *Essentials from the Golden Cabinet :Volume 7 of Diagnosis and Treatment of Lung Atrophy, Abscess, Cough, and Qi Rising*), the description "coughing with qi counterflow and a sound like a water bird in the throat (咳而上气，喉中水鸡声)" also reflects the symptoms of asthma.

Many ancient texts have recorded the etiology and pathogenesis of asthma. For instance, *Jin Gui Yao Lue Tan Yin Ke Sou Bing Mai Zheng Bing Zhi Pian* (《金匮要略·痰饮咳嗽病脉证并治篇》 *Synopsis of Prescriptions of the Golden Chamber: Diagnosis, Syndromes and Treatment of Phlegm Retention and Cough*) notes, "distension, panting, coughing, and vomiting... must involve hidden fluid retention (满喘咳吐……必有伏饮)". These passages indicate that TCM views asthma as primarily

caused by phlegm and fluid retention (痰饮). And *Zheng Zhi Hui Bu Xiong Ge Men* (《证治汇补·胸膈门》*Syndrome Identifications and Treatments: the Chest and Diaphragm*) further elaborates: "Internal congestion of qi, exposure to unseasonal external pathogens, and the presence of stubborn phlegm in the diaphragm—these three factors combine to obstruct the airway, creating striking sounds and leading to asthma (内有壅塞之气，外有非时之感，膈有胶固之痰，三者相合，闭拒气道，搏击有声，发为哮病)". This passage reinforces the idea that asthma arises from the interplay of internal qi stagnation, external pathogenic factors, and persistent phlegm obstruction.

Compared to conventional probiotic treatment, TCM formulas that simultaneously treat the lung and large intestine such as *Bu Fei Se Chang Tang* (补肺涩肠汤 Lung-tonifying Diarrhea-treating Decoction),[19] can achieve superior therapeutic effects. This is evident in higher asthma control test (ACT) scores and asthma control rates in children. The prescription of *Bu Fei Se Chang Tang* helps correct the deficiency of lung qi and improve the children's constitution of qi deficiency, thereby alleviating asthma symptoms. Similarly, the combination of *Ma Shao Ping Chuan Tang* (麻芍平喘汤 Peony Cough-relieving Decoction) with conventional Western medicine treatment has a higher efficacy by increasing the abundance of *Bifidobacterium* and *Lactobacillus* while decreasing the abundance of *Escherichia coli*. There was also a more significant reduction in the secretion of IL-6 and TNF-α.[20] Lycium barbarum polysaccharides alone also can promote the abundance of *Bifidobacterium* and *Lactobacillus* as well as decrease the levels of IL-4, IL-6, and TNF to treat allergic asthma.[21]

In addition, a study involving 100 asthmatic patients reported that acupuncture at acupoints from the large intestine meridian (大肠经) and lung meridian (肺经) can relieve recurrent wheezing, chest distress, dyspnea, and coughing, thus achieving lower scores of TCM symptoms during the treatment of bronchial asthma.[22] Furthermore, in asthmatic mice, simultaneous moxibustion at Feishu (BL13), the Back-Shu point (背俞穴) of the lung, and Tianshu (ST25), the Front-Mu point (募穴) of the large intestine, decreased the levels of IL-5, IL-13, interleukin 33 (IL-33), and leukotriene (LT) in the lungs of asthmatic mice. Additionally, compared to moxibustion at Feishu (BL13) alone, the peak expiratory flow (PEF), forced expiratory volume/forced vital capacity (FEV/FVC), and lung resistance all showed more significant improvements.[23]

3 Mechanism of decoctions in the treatment under the guideline of TCM theory "treating the lung diseases by treating the large intestine"

Modern research has shown that the effectiveness of TCM in preventing and treating lung diseases may be closely related to its ability to protect the gut mucosal barrier, remodel the gut homeostasis, and alleviate inflammatory response. Since the gut microbiota usually has direct and prolonged contact with TCM decoctions in the intestine, the species, quantity, and composition of gut microbiota can be significantly influenced by TCM. Simultaneously, the gut microbiota metabolizes the herbal decoction into certain bioactive components, which subsequently exert therapeutic efficacy.[24] Altered gut microbiota or the presence of herbal metabolic products are good indications of the therapeutic effects of TCM.[25]

Metabolites of the gut microbiota, including trimethylamine N-oxides, short-chain fatty acids (SCFAs), and bile acids, can affect various biological processes in the human body by activating different signaling pathways. They also have the unique advantage of having multiple components and corresponding biological targets. With the advancement of microbiome technology, there is increasing evidence suggesting that the gut microbiota is related to multiple lung diseases, thus supporting its potential as a target for therapeutic intervention in the treatment of lung diseases.

Therefore, we focus on the gut microbiota to explain the underlying mechanisms of action. And this may provide a modern mechanistic explanation for the theory of the exterior-interior relationship between the lung and the large intestine.

3.1 Protection of the gut mucosal barrier

TCM remedies can help recover and maintain the integrity of the gut mucosal barrier in the large intestine to treat acute lung injury. D-lactic acid (D-LA) is a metabolite produced by gut microbiota, and diamine oxidase (DAO) is an intracellular enzyme. As indicators reflecting the function of the large intestine barrier, D-LA and DAO increase when damage to the intestinal barrier occurs. After taking *Da Cheng Qi Tang*, the up-regulated expression of D-LA and DAO, as well as the HMGB1-RAGE signaling pathway caused by severe acute pancreatitis-associated acute lung injury (SAP-ALI), decreased.[26] Besides that, astragalus polysaccharides can relieve cyclophosphamide-induced gut mucosal injury in mice by increasing the area of Paget's lymph node in the small intestinal mucosa.[27]

Aside from that, *Tong Fu* formulas (通腑方), such as *San Huang Xie Xin Tang* (三黄泻心汤 Three Yellows Heart-draining Decoction),[28] are also effective in protecting the gut immune barrier through their anti-inflammatory effects. This is achieved by inhibiting the expressions of TLR4, myeloid differentiation factor 88 (MyD88), as well as the phosphorylation of the inhibitory subunit of NF kappa B alpha (IκBα). They can also significantly restore the integrity of the colon barrier and increase beneficial microbiota.

Current research has confirmed that nourishing/tonifying as well as heat-clearing and toxic-removing TCM compounds or active components, can maintain

the integrity of the gut barrier. They achieve these effects by increasing the number of mucosal epithelial lymphocytes and goblet cells, as well as promoting the secretion of mucosal sIgA and the homing of lymphocytes in mucosal immune dysfunction of the lung and the large intestine.[29] For example, houttuynia cordata polysaccharides, which is an herb commonly used to clear heat and remove toxins, can alleviate lung injury by inhibiting the expression of TLR4, nuclear factor kappa B (NF-κB), and the secretion of cytokines such as TNF-α, IL-6, and IFN-α after infection with the influenza A (H1N1) virus. At the same time, it also increased the secretion of gut sIgA levels in the gut mucus and the expression of ZO-1 protein in the gut epithelial tight junctions, providing further protection of the gut mucosal barrier.[30]

3.2 Remodeling of the gut homeostasis

3.2.1 Regulation and restoration of diversity of gut microbiota

The disorders of gut microbiota are speculated to be one of the causes of pulmonary inflammation. While TCM therapy can reverse the abundance and diversity of gut microbiota, thus preventing or reversing any alterations caused by lung diseases.

For example, during pneumonia treatment, the administration of *Ge Gen Qin Lian Tang*, *Ma Xing Shi Gan Tang* (麻杏石甘汤 Ephedra, Apricot Kernel, Gypsum and Licorice Decoction), or *Huo Xiang Zheng Qi Shui* (藿香正气水 Agastache Qi-correcting liquid) results in the simultaneous increase in abundance of *Lactobacillus* and decrease in the abundance of *Escherichia coli* (Table 2). Besides that, the administration of ephedra polysaccharides or *Ting Li Da Zao Xie Fei Tang* (葶苈大枣泻肺汤 Lepidium/Descurainiae and Jujube Lung-Draining Decoction) can result in the upregulation of *Lactobacillus* abundance. Meanwhile, baicalin alone can cause the downregulation of *Escherichia coli* abundance.

TCM also has certain advantages in treating other lung diseases by regulating gut microbiota and restoring the balance of gut microecology. For example, in cases of acute lung injury, both *Jin Yin Hua* (金银花 Flos Lonicerae Japonicae) and *Shan Yin Hua* (山银花 Flos Lonicerae) can increase the abundance of *Akkermansia*. For patients with asthma and COPD, the administration of *Ma Shao Ping Chuan Tang* often results in an increased abundance of *Bifidobacterium* and *Lactobacillus*.

As shown in Table 2 , Table 3 and Table 4, the abundance of *Bacteroidetes* was frequently increased after the administration of many recipes/herbal decoctions that are usually used to treat lung diseases, such as *Ma Xing Shi Gan Tang*, *Huo Xiang Zheng Qi Shui*, *Shen Fu Tang* (参附汤 Ginseng and Aconite Decoction), or single herbs and active components such as baicalin (a flavonoid extracted from *Huang Lian*), *Jin Yin Hua*, and *Shan Yin Hua*. Furthermore, *Ge Gen Qin Lian Tang*, *Ma Xing Shi Gan Tang*, Ageratum Liquid, *Ma Shao Ping Chuan Tang*, and baicalin can reduce the abundance of *Escherichia coli* when administrated to treat lung diseases. This supports the theory that gut microbiota may play a vital role in the recovery of lung diseases.

3.2.2 Inhibition of the translocation of gut microbiota

TCM also improves patient prognosis by enhancing the constitution of gut microbiota. For example, Lycium barbarum polysaccharides can increase the abundance of *Lactobacillus*, inhibiting the adhesion and colonization of harmful bacteria.[21]

In addition, the translocation of bacteria from the large intestine into other tissues aggravates many disease processes. Fortunately, herbal medicine such as Ageratum liquid[37] can effectively prevent gut bacterial translocation after H9N2 avian influenza virus (AIV) infection and provide strong protection against the translocation of *Escherichia coli* from the liver to the lung.[38] Due to the weakened gut barrier in H9N2 AIV mice, the gut microbiota can also translocate into the mesentery tissue, in addition to crossing the gut barrier and transferring to the liver and lungs. Besides that, baicalin also inhibits the translocation of gut bacteria to the mesentery, liver, and lungs, thereby preventing the occurrence of secondary bacterial infections. It does so by alleviating the oxidative stress response, reducing the damage done to the gut mucosal barrier, and protecting ileal mucus layer construction, as well as tight junctions.[39]

3.2.3 Regulation of the metabolism of gut microbiota

SCFAs, mainly butyrate, propionate, and acetate, are thought to mediate the communication between the gut microbiome and the immune system, as they can enter the blood and play a role in pulmonary immune responses. Studies have found that TCM can also treat lung diseases by regulating SCFAs through gut microbiota.

More specifically, TCM typically induces an increase in SCFAs. For example, the *Qing Fei Yin* recipe can increase SCFAs (mainly acetate and butyrate) while inhibiting the activation of the NF-κB-NLRP3 pathway to promote the relief of bacterial pneumonia in mice.[32]

TCM can also modulate SCFAs-related microbiota. For example, *Qing Fei Pai Du Tang* (清肺排毒汤 Lung-clearing Toxin-resolvng Decoction) can improve the abundance of *Rom-boutsia* and *Turicibacter*, which are both related to the production of SCFAs.[47] Other than that, *Si Ni Tang* (四逆汤 Frigid Extremities Decoction)[48] can increase the relative abundance of SCFAs-related *Lachnospiraceae NK4A136 group*, *Lachnoclostridium*, and *Faecalibaculus* in mice with lung injury. There are also many studies suggesting that SCFAs may offer new opportunities for the treatment of pulmonary fibrosis. All these speculations deserve further study and exploration.

Table 2 TCM compound regulating the gut microbiota in the treatment of pneumonia

Compound	Changes in the Abundance of Gut Microbiota (Abundance↑)	Changes in the Abundance of Gut Microbiota (Abundance↓)	Immunity	References
Shen Ling Bai Zhu San (参苓白术散 Ginseng, Poria and Atractylodes Macrocephalae Powder)	*Firmicutes*, *Tenericutes*	*Actinobacteria*, *Epsilonbacteraeota*, *Proteobacteria*, *Patescibacteria*	(Level↓): TNF-α, IL-1β, IL-2, IL-6, IL-8, IL-12 (Level↑): IL-10	31
Qing Fei Yin (清肺饮 Lung-clearing Beverage)	*Butyricicoccus*, *[Ruminococcus]*, *Coprococcus*, *Dehalobacterium*, *Prevotella*, *Parabacteroides*, *Rikenella*	–	–	32
Ge Gen Qin Lian Tang	*Akkermansia_muciniphila Desulfovibrio_C21_c20*, *Lactobacillus_salrius*	*Escherichia coli*	(Level↓): IL-17A, IL-6, TGF-β	33
Ting Li Da Zao Xie Fei Tang	*Bifidobacterium*, *Lactobacillus*	*Enterobacteriaceae*	(Levels↓): Eosinophil cationic protein (ECP), IL-4, IL-5 (Level↑): IL-2, IFN-γ	34
Ma Xing Shi Gan Tang	*Bacteroidetes*, *Coprococcus*, *Firmicutes*, *Lactobacillus*	*Escherichia coli*, *Proteobacteria*, *Verrucomicrobia*	(Level↓): CCL5, CXCL10,	35
Xuan Bai Cheng Qi Tang	*Firmicutes*, *Lachnospiraceae*, *Anaerostipes*, *Erysipelatoclostridium*, *Blautia*	*Verrucomicrobia*, *Enterobacteriaceae*, *Flavonifractor*, *Cuneatibacter*, *Proteus*	(Levels↓): IL-1β, IL-6, TNF-α	36
Huo Xiang Zheng Qi Shui	*Bacteroidetes*, *Desulfovibrio*, *Lactobacillus*, *Lachnospiraceae_ NK4A136_group*,	*corynebacterium-1*, *Escherichia coli*, *Streptococcus*, *Staphylococcus*,	–	37,38

Table 3 TCM single herbs regulating the gut microbiota in the treatment of pneumonia

Single Herbs	Changes in the Abundance of Gut Microbiota (Abundance↑)	Changes in the Abundance of Gut Microbiota (Abundance↓)	Immunity	References
Baicalin	*Bacteroidetes*	*Escherichia coli*	(Levels↓): IL-6, IL-22, IL-17A, IL-1β TNF-α, IFN-γ	39
Berberine	*Ruminococcaceae (Rumex family)*	–	(Levels↓): CCL25 IFN-γ	40
Ephedra polysaccharide	*Bifidobacterium*, *Lactobacillus*	*Enterococcus*	(Level↓): IL-6, IL-8, TNF-α	41
Houttuynia cordata polysaccharide	–	*Bacillus*, *Vibrio*	(Level↓): IL-1β (Level↑): IL-10	42

Table 4 TCM regulating the gut microbiota back to treat other lung diseases

Compound/Single Herbs	Treatment of Diseases	Changes in the Abundance of Gut Microbiota	Intestinal Immunity	References
Shen Fu Tang	COPD	(Abundance↑): *Bacteroidetes* (Abundance↓): *Proteobacteria*	(Level↑): sIgA (Level↓): IL-6, TNF-α	[43]
Qing Re Hua Tan Tang (清热豁痰方 Heat-clearing and Phelgm-dispersing Formula)	COPD	(Abundance↑): *Eggerthella*, *Enterobacter*, *Eubacterium*	–	[44]
Ma Shao Ping Chuan Tang	Bronchial asthma	(Abundance↑): *Bifidobacterium*, *Lactobacillus* (Abundance↓): *Escherichia coli*	(Levels↓): IL-6, TNF-α, ACTH, CORT	[20]
You Gui Wan (右归丸 Right-restoring Pill)	Allergic asthma	(Abundance↑): *Blautia*, *Desulfovibrio*, *Lachnospiraceae_NK4A136_group* (Abundance↓): *Fusobacterium*, *Streptococcus*, *Staphylococcus*	(Level↓): IgE, TNF-α	[45]
Lycium barbarum polysaccharides	Asthma	(Abundance↑): *Lactobacilli*, *Bifidobacteria* (Abundance↓): *Alistipes*, *Actinobacteria*, *Clostridiales*	(Level↓): IL-4, IL-6, IL-17A MCP-1, TNF-α	[21]
Jin Yin Hua (*Lonicera japonica Flos*)	Acute lung injury	(Abundance↑): *Adlercreutzia*, *Akkermansia*, *Bacteroides*, *Bifidobacterium*, (Abundance↓): *Proteus*	(Level↓): IL-6, IL-1β, TNF-α	[46]
Shan Yin Hua (*Lonicera hypoglauca Flos*)	Acute lung injury	(Abundance↑): *Akkermansia*, *Bacteroides*, *Ruminococcaceae*	(Level↓): IL-6, IL-1β, TNF-α	[46]

Moreover, some scholars have also studied the influence of TCM on metabolism through the modulation of gut microbiota. A study found that pure acidic polysaccharides extracted from *Ma Huang* (麻黄 *Ephedrae Herba*)[41] could enhance the abundance of *Lactobacillus* and *Bifidobacterium* families to improve metabolism during the treatment of H1N1. On the other hand, *Qin Qiao Xiao Du Fang* (芩翘消毒方 Scutellaria Root and Forsythia Capsule Toxin-resolving Decoction)[49] can protect mice from influenza virus infection by increasing gut cyano amino acid as well as carbohydrate metabolisms. Moreover, the increased numbers of *Parabacteroides*, *Pediococcus*, and *Clostridium* caused by *Qin Qiao Xiao Du Fang* are positively correlated with the increased metabolism of cyano amino acid, which might account for its therapeutic roles.

3.3 Alleviation of inflammatory response

TCM also relieves lung inflammatory response by reducing the expression of inflammatory factors through gut microbiota. In fact, alterations in the composition of gut microbiota have been found to correlate with the levels of many inflammatory factors, including TNF-α, IL-6 and IL-1β. For example, after taking *Ma Xing Shi Gan Tang*, the expressions of chemokine CC motif ligand 5 (CCL5) and C-X-C motif chemokine ligand 10 (CXCL10) were reduced, following changes in the abundance of related gut microbiota. Meanwhile, *Ma Xing Shi Gan Tang* also promotes the growth of *Lactobacillus* and *Coprococcus* during influenza virus infection.[35] The increase of *Lactobacillus* in asthma-afflicted mice resulting from the administration of Lycium barbarum polysaccharides was reported to correlate with the decrease of TNF-α and IL-6.[21] The decreased levels of IL-1β, IL-6 and TNF-α were also found to be highly correlated with certain microbiota following treatment with *Jin Yin Hua* or *Shan Yin Hua*.[46] *Xuan Bai Cheng Qi Tang*[50] inhibited the pulmonary inflammatory response in COPD mice by correcting the elevated ratio of Th17/Treg, inhibiting the infiltration of inflammatory cells, and reducing the expression of TNF-α, IL-1β, and matrix metalloproteinase 9 (MMP-9).

Many studies have shown certain correlation between changes in gut microbiota and inflammatory factors following the intervention of TCM. *Firmicutes* can produce propionate, which in turn can control intestinal γδT cells and reduce IL-17 production by inhibiting

histone deacetylase.[51] And in Table 1, we can see the up-regulation of *Firmicutes* and the down-regulated expression of other inflammatory factors (excluding IL-17) simultaneously, indicating a potential correlation between these two. And in Table 1, when IL-17 is decreased, other kinds of gut microbiota also show changes, indicating that there may be another mechanism to control IL-17.

Additionally, TCM plays anti-inflammatory roles and alleviates pulmonary symptoms through the regulation of various signaling pathways. For example, prescriptions for treating the large intestine with TCM can also treat lung diseases by regulating the activation of the NF-κB signaling pathway. The protective mechanism of Tanshinone IIA sodium sulfonate[52] in reducing lung inflammatory response is related to the inhibition of TLR4/NF-κB activation. The Modified *Xuan Fei Tong Fu Fang* (宣肺通腑方加减 Lung-dispersing Viscera-unblocking Formula)[53] can reduce inflammation by inhibiting the activation of p38 MAPK and NF-κB pathways, while TCM medicines both treating the lung and the intestines[54] can regulate the NF-κB/NLRP3 signaling pathway. Besides that, *Ma Huang Tang* (麻黄汤 Ephedra Decoction) combined with *Da Cheng Qi Tang*[55] can down-regulate NF-κB activation and regulate the polarization of M1/M2 macrophages, subsequently treating acute lung injury. Moreover, *Xuan Bai Cheng Qi Tang* has been proven to ameliorate histological damage and protect the structure of the lungs in mice infected with influenza A virus (IAV) by inhibiting the Toll-like receptor 7 (TLR7)/MyD88/NF-κB signaling pathway. A study showed that *Da Huang* is an essential component for the therapeutic effects of *Xuan Bai Cheng Qi Tang*, and its removal resulted in a significant decrease in the treatment efficacy against viral pneumonia.[36]

4 Discussion

4.1 The continuous exploration of the interior-exterior relationship between lung and large intestine

In terms of qi movement, it is believed that the transmissive and conductive functions of the large intestine depend on the descending and dispersing functions of the lung qi, and vice versa. *Ling Shu Si Shi Zhi Qi* (《灵枢·四时之气》 *The Spiritual Pivot: The Qi of the Four Seasons*) said: "Bowel sounds, qi rushing up to the chest, wheezing and unable to stand for a long time, these symptoms indicate that the disease is in the large intestine (腹中常鸣气上冲胸，喘不能久立，邪在大肠)". It is pointed out that lung diseases like cough and asthma are caused by damage to the large intestine, subsequently the failure of large intestine to conduct, *Fu-qi* stagnation, qi movement imbalance, and upward movement of lung qi. Similarly, lung diseases that persist for a long time, the failure of lung qi to disperse and descend will affect the descending of large intestine and the function of conducting dregs, resulting in abdominal distension, constipation and other symptoms.

Regarding the transport and metabolism of fluids, both the lung and large intestine are major players that ensure normal water and fluid metabolism. The combination of the two can make the qi move up and down smoothly, thus ensuring the normal distribution of body fluid. *Wen Bing Tiao Bian* (《温病条辨》 *Systematic Differentiation of Warm Diseases*) written by Wu Jutong (吴鞠通) in the Qing dynasty, proposed the first treatment and formula for the simultaneous treatment of the lung and large intestine. During the progressive stage of infectious diseases, when purgative methods of TCM are ineffective, *Xuan Bai Cheng Qi Tang* is recommended to treat diseases by restoring the descending function of the lung qi. Therefore, the interior-exterior relationship between the lung and the large intestine is an essential TCM theory, and the "simultaneous treatment of lung and large intestine" is effective in guiding clinical treatment.

With the continuous development of Western medicine, we have constantly contemplated the material basis of the interior-exterior relationship between the lung and the large intestine. The large intestine dysfunction affects lung function, and vice versa. In model rats, the histopathological morphology of the lung and large intestine changes together, while other organs remain unaffected.[56]

As aforementioned, according to histology and embryology, the lung and large intestines belong to the same germ layer. This is one of the more recognized material bases for the relationship between the lung and large intestine. However, it has not been able to systematically explain the modern medical basis of the interior-exterior relationship between the lung and the large intestine. Furthermore, the interior-exterior relationship between the lung and the large intestine is still a source of inspiration for clinical TCM treatment today. This is evident from the treatment of COVID-19, which is based on the theories of "treating the lung diseases by treating the large intestine" and "simultaneous treatment of lung and large intestine".

4.2 Gut microbiota as a potential target in the treatment of pulmonary diseases

We have found correlations between gut microbiota and therapeutic efficacy in many studies, suggesting that gut microbiota may be a potential target for the treatment of infectious pneumonia. Some scholars have speculated that the gut microbiota may be a potential target of *Qian Jin Wei Jing Tang* (千金苇茎汤 Phragmites Stem Decoction from *Important Formulas Worth a Thousand Gold Pieces for Emergency*) in the treatment of respiratory diseases.[57] Furthermore, gut microbiota is thought to be one of the initial causative factors of pneumonia, providing new opportunities for clinical prevention and treatment.

TCM, with its holistic concepts and advantages in regulating gut microbiota, puts forward the idea that

we should focus on restoring the balance of beneficial bacteria and harmful bacteria, rather than supporting or eliminating any one party. This differs from the actions of antibiotics, which eliminate all microorganisms indiscriminately. Therefore, TCM treatment can be a great method to alleviate the adverse effects of antibiotic abuse such as disorders or imbalances of gut microecology. In fact, one of the major advantages of TCM over antibiotics is that it can achieve therapeutic effects without further damaging the gut microecology. For example, *Yu Xing Cao* (鱼腥草 Herba Houttuyniae) could restore the baseline composition of gut microbiota caused by H1N1 infection while significantly decreasing the abundance of detrimental bacterial strains such as *Vibrio* and *Bacillus*.[50] These provide considerable prospects for future exploration of TCM use in combination with Western medicine.

5 Conclusions and prospects

TCM has shown an advantageous role in treating lung diseases through the prevention and treatment of COVID-19. Besides that, it has also achieved good results in the treatment of other lung diseases such as COPD, asthma, and ARDS. Among them, the method of treating lung diseases by treating the large intestine is a unique strategy of TCM (Fig. 1). And the gut microbiota may be an important target for intervention in the treatment of lung diseases.

The theory that the lung and large intestine being interior-exteriorly related provides a unique view on life for modern medicine and highlights the value of the classics. For similar ancient theories, even if we cannot fully explain them clearly, we must not overlook their significance. Only by balancing inheritance and innovation, can the wisdom of TCM be revitalized in modern medical practice, relieving illness and pain while bringing blessings and hope.

The interior-exterior relationship between the lung and the large intestine is an important theory in TCM which suggests that we should pay attention to the holism and correlation between the lungs and large intestine in the diagnosis and treatment of diseases.

Besides lung diseases, TCM can also treat other diseases such as encephalopathy by regulating the composition and abundance of gut microbiota. There are also an increasing number of studies focusing on the lung-gut axis, brain-gut axis, and gut-liver axis, etc. Fortunately, these studies also provide strong support for the use of integrated TCM and Western medicine. In a word, detailed mechanisms of TCM in protein expression related to tight junctions and gut wall integrity, the metabolism of gut microbiota, as well as the subsequent inflammatory immune response need to be further investigated to provide stronger evidence for its use in the clinical setting.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by the author.

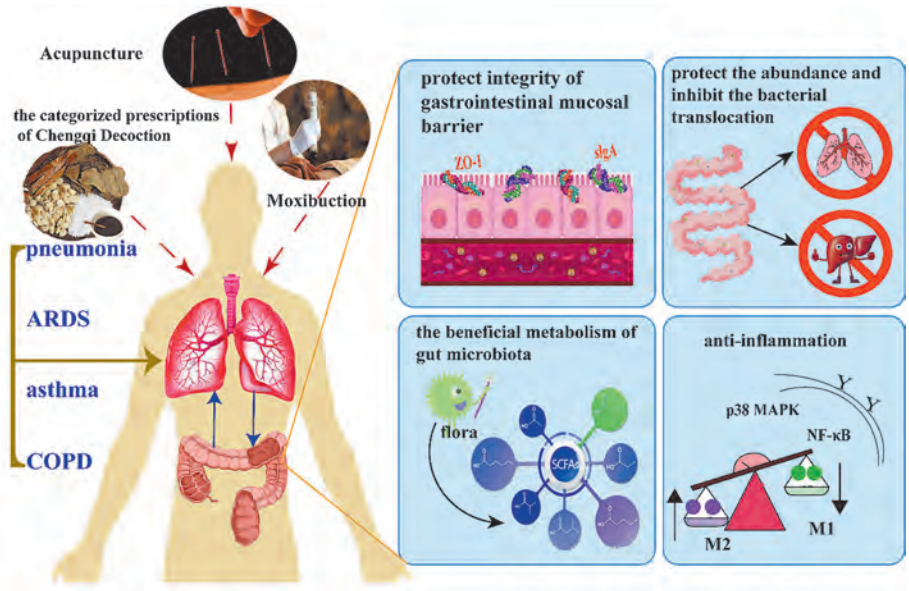


Figure 1 TCM can cure lung diseases by treating the large intestine (source with permission from: picture made by the authors)

Author contributions

ZHANG Yujie drafted the manuscript, designed the graphical abstract and the tables. ZHANG Hanxiao drafted the manuscript, designed the graphical abstract. Zhao Ling participated in the discussion and provided suggestions. Ong Naomi polished the manuscript. HU Jing reviewed, edited the final version of the manuscript, and provided fund support. ZHENG Yuejuan drafted the manuscript, reviewed, edited the final version of the manuscript, and provided fund support. All authors reviewed and approved the final version of the manuscript.

Conflicts of interest

ZHENG Yuejuan is a Youth Editorial Board member of *Chinese Medicine and Culture*. The article was subject to the journal's standard procedures, with peer review handled independently of the Youth Editorial Board member, and her research groups.

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Original Article

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The Formation and Development of Joseon's Indigenous *Onyeokhak*: From the Perspective of Sino-Korean Medical Exchange

Sanghyun Kim[1,✉]

Abstract

This study examines the development of *Onyeokhak* (瘟疫学 epidemic medicine), Joseon Korea's institutionalized, state-led model of epidemic medicine, and evaluates its unique position within the East Asian medical tradition. By analyzing foundational texts such as *Donguibogam* (「東醫寶鑑」*Mirror of Eastern Medicine*), *Gani Byeokonbang* (「簡易辟瘟方」*Simplified Formulas for Preventing Epidemic Diseases*) and *Byeokyeok Sinbang* (「辟疫神方」*Divine Prescriptions for Preventing Epidemics*), this research compares Joseon's administrative and practical frameworks with the scholar-driven, theoretical evolution of *Wen Bing* (温病 warm disease) studies in China. Unlike the Chinese trajectory, where paradigms shifted through academic contestation, Joseon's *Onyeokhak* was forged by government-mandated public health policies. This resulted in simplified and utilitarian manuals that prioritized vernacular accessibility and symptom-centered clinical protocols rather than abstract theoretical depth. The findings reveal that while *Onyeokhak* originated from bureaucratic necessity, it evolved into a dynamic system through context-sensitive adaptations, such as the exclusion of irrelevant endemic diseases and the implementation of stepwise clinical decision-making procedures. This study highlights the historical diversity of East Asian medicine and proposes that Joseon's pragmatic, state-centered strategies offer valuable heuristics for modern emergency public health preparedness and risk communication.

Keywords: Joseon dynasty; Epidemic medicine; *Wen Bing* (温病 warm disease); Plague; *Onyeokhak* (瘟疫学 epidemic medicine)

1 Introduction

From a historical and medical perspective, epidemics have been both pivotal events and major challenges for human society. In the realm of medicine, epidemic diseases are not only urgent issues that demand immediate responses but also long-standing subjects of inquiry. This is particularly true in East Asia, where historical records frequently mention infectious and pandemic diseases under the term *Yeok* (疫 epidemic), and traditional medical systems developed various strategies to address them.

However, the prominence of epidemic medicine within East Asian traditional medicine remains relatively marginal compared to its historical significance. The dominant medical paradigms largely focused on diseases caused by external pathogenic factors, yet epidemics were not consistently treated as central issues within these frameworks. Instead, the understanding of epidemic diseases evolved gradually as a subcategory of external pathogenic disorders (外感病), without necessarily achieving full theoretical independence.

Within this general context, Korea—particularly the Joseon dynasty—followed a similar trajectory while also displaying unique characteristics. At the center of this divergence lies a distinctive response to epidemic outbreaks and the development of a dedicated academic and institutional field: *Onyeokhak* (瘟疫学 epidemic medicine).

A previous study by a scholar explored the historical context surrounding the publication of simplified epidemic manuals during the Joseon dynasty.[1] However, its analysis of the manuals' full content was relatively brief, and no significant follow-up research was conducted for some time. To supplement this earlier work, the author later conducted a comprehensive analysis of the full content of simplified epidemic manuals from the Joseon dynasty, which was presented as a doctoral dissertation.[2] Building upon that previous research, the present paper seeks to draw out its medical-historical significance and offer it here for consideration by the scholarly community.

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This paper first outlines the formation and transformation of external pathogenic disease paradigms in traditional Chinese medicine (TCM). It then explores how the Joseon dynasty perceived and responded to epidemics, ultimately examining the unique position of *Onyeokhak* from the perspective of Sino-Korean Medical Exchange. By doing so, the study aims to clarify the historical significance and intellectual uniqueness of the Joseon dynasty's response to epidemic threats.

2 The origins of the Joseon dynasty's epidemic medicine: conceptualizing external pathogenic disorders in traditional Chinese medicine

2.1 *Shang Han* as the archetype of exogenous febrile disorders

In East Asian traditional medicine, humans were historically understood as beings formed in accordance with the principles of nature, and maintaining harmony with natural rhythms was regarded as essential for health and longevity. Accordingly, personal health cultivation (养生 *Yang Sheng*) and the avoidance of unseasonal external pathogens were emphasized as fundamental strategies for disease prevention. It was believed that when the body's vital energy (正气 *Zheng Qi*) was abundant, external pathogenic factors (邪气 *Xie Qi*) could not easily invade. This perspective placed particular importance on individual bodily condition and daily regulation in responding to exogenous diseases.

Within this conceptual framework, even natural climatic forces were considered capable of becoming pathogenic when they acted inappropriately upon the human body. When seasonal influences were excessive, untimely, or encountered a body with weakened resistance, they could disrupt the dynamic balance of yin and yang and thereby give rise to diseases. On this basis, external pathogens were thus systematized into *Liu Yin* (六淫 six excesses): *Feng* (风 wind), *Han* (寒 cold), *Shu* (暑 summer-heat), *Shi* (湿 dampness), *Zao* (燥 dryness), and *Huo* (火 fire). Among *Liu Yin*, *Han* was regarded as the most severe and dangerous pathogenic factor because of its constricting and stagnating nature, which was believed to impair the flow of qi and blood and to damage yang qi in particular. As a result, exogenously induced febrile diseases were broadly subsumed under the category of *Shang Han* (伤寒 cold damage) from early antiquity. This understanding was succinctly articulated in *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*), chapter *Re Lun* (热论 On Heat), which stated: "All febrile diseases belong to the category of cold damage (夫热病者, 皆伤寒之类也)". This statement reflects the early integrative view that manifestations of heat were often understood as transformations of cold-induced pathology, thereby laying an important theoretical foundation for the subsequent development of classical discussions on febrile diseases in Chinese medical history.

The formation of exogenous disease theory in early TCM unfolded along two parallel yet distinct scholarly traditions, each contributing in different but complementary ways to the maturation of medical knowledge. One tradition was the medical classicist lineage, which was primarily concerned with constructing comprehensive theoretical frameworks grounded in cosmology, physiology, and pathology. This lineage relied heavily on authoritative canonical texts, most notably *Huang Di Nei Jing*, through which fundamental concepts such as yin-yang balance, *Wu Xing* (五行 five elements), and the relationship between the human body and climatic influences were systematically articulated. The other was the formula-based (经方 *Jing Fang*) tradition, which emphasized empirical clinical experience and the accumulation of effective prescriptions. The most representative and influential achievement of this latter tradition is Zhang Zhongjing's (张仲景) *Shang Han Za Bing Lun* (《伤寒杂病论》*Treatise on Cold Damage and Miscellaneous Diseases*), compiled in the late Eastern Han period. This work addressed both *Shang Han* as the representative form of exogenous diseases and miscellaneous disorders associated with internal damage, thereby encompassing the full range of diseases recognized at the time. In doing so, it offered a comprehensive account of the disease spectrum recognized in its historical context, integrating theory with concrete therapeutic strategies. Although the original manuscript was lost during periods of warfare, it was later collected and reorganized by Wang Shuhe (王叔和) of the Jin dynasty, during which process the *Shang Han* portion was separated and transmitted independently as *Shang Han Lun* (《伤寒论》*Treatise on Cold Damage*).

During the Northern Song dynasty, a large-scale, state-led project of medical collation and publication was carried out under the Bureau for Editing Medical Texts (校正医书局). Through this initiative, key Zhang Zhongjing–related works—including *Shang Han Lun*, *Jin Gui Yao Lue* (《金匮要略》*Essentials from the Golden Cabinet*), and *Jin Gui Yu Han Jing* (《金匮玉函经》*The Jade Case Classic of the Golden Cabinet*)—were systematically edited and printed.[3] The Song edition of *Shang Han Lun* subsequently functioned as a canonical standard, establishing *Shang Han* as the central paradigm for understanding exogenous febrile disorders. This standardization shaped the intellectual orientation of later generations of physicians, from Cheng Wuji (成无己) of the Song–Jin period to commentators such as Fang Youzhi (方有执) and Ke Qin (柯琴) in the Ming–Qing era.

At the same time, comprehensive medical compendia such as *Zhou Hou Bei Ji Fang* (《肘后备急方》*Emergency Formulas to Keep up One's Sleeve*), *Qian Jin Yao Fang* (《千金要方》*Important Formulas Worth a Thousand Gold Pieces*), and *Wai Tai Mi Yao* (《外台秘要》*Arcane*

Essentials from the Imperial Library) consistently devoted substantial sections to *Shang Han*, treating it as the primary framework for exogenous diseases. Within these works, conditions such as *Wen Yi* (瘟疫 pestilence) and *Shi Yi* (时疫 seasonal epidemics)—which were not explicitly addressed in *Shang Han Lun*—were incorporated as subordinate categories. This arrangement indicates that while *Shang Han* remained the dominant paradigm for exogenous febrile illnesses, epidemic diseases were already recognized as exceptional conditions that could not be fully assimilated into ordinary *Shang Han* pathology.

2.2 Rise of *Wen Bing* studies during the Ming–Qing period

Despite the longstanding dominance of the *Shang Han* paradigm, its explanatory and therapeutic limitations became increasingly apparent during recurrent outbreaks of large-scale epidemics in the late Ming dynasty to the Qing dynasty. Although epidemic diseases were formally classified under *Shang Han* in classical canons and later encyclopedic compilations, their atypical clinical presentations—characterized by rapid transmission, acute onset, and high mortality—often eluded effective treatment within the standard *Shang Han* framework, particularly the pattern differentiation of six meridians (六经辨证) and its associated therapeutic strategies. These tensions between established theory and clinical reality prompted physicians at the time to seek alternative frameworks for understanding exogenous febrile disorders. This intellectual reorientation had coincided with significant developments in medical thought since the Jin–Yuan period, when sustained scholarly debates on the pathological mechanisms of disease had flourished. Influential theories emphasizing *Huo* and *Re* (热 heat), as well as discussions of internal injury and constitutional vulnerability, expanded prevailing conceptions of the human body and its responses to illness.

Within this evolving theoretical landscape, physicians increasingly argued that even exogenously contracted diseases ultimately manifested as internal heat or fire, or that deficiencies in the body's *Yuan Qi* (元气 primordial qi) could predispose the organism to pathological hyperactivity of *Huo*. Building upon this growing body of theoretical reasoning, new therapeutic approaches to febrile disorders were articulated and refined through clinical practice. Case records and accumulated experiential knowledge gradually lent empirical credibility to these approaches, reinforcing their clinical utility. It was in this context that *Wen Bing* (温病 warm disease) theory emerged. Grounded in scholarly debate and sustained clinical observation, *Wen Bing* theory represented an effort to reconcile inherited doctrinal traditions with the pressing demands of epidemic disease, thereby reshaping the conceptual and therapeutic landscape of exogenous febrile disorders.

Unlike *Shang Han* theory, which took cold pathogens as its central explanatory focus, *Wen Bing* theory emphasized invasions characterized by warmth or heat in nature. Proponents of *Wen Bing* theory argued that such pathogenic factors differed from *Shang Han*, not only in their external climatic qualities but also in their modes of transmission, patterns of progression, and clinical manifestations. While some *Wen Bing* scholars still addressed contagious diseases (瘟疫) as a subset, their clinical observations expanded the theoretical scope of exogenous febrile illnesses. Importantly, the emergence and flourishing of *Wen Bing* theory did not lead to the wholesale replacement of *Shang Han* theory. Instead, the two paradigms coexisted over long historical periods and were often employed in a complementary manner in clinical practice. Physicians selected explanatory models and treatment strategies according to the specific nature of the illness, regional climatic conditions, and the patient's constitution. Consequently, rather than representing a single, linear paradigm shift, the historical development of exogenous disease theory in China is better understood as a process of diversification and theoretical pluralism, in which multiple interpretive frameworks were continuously negotiated, refined, and integrated.

The diversification of exogenous disease theory, characterized by the coexistence and mutual supplementation of *Shang Han* and *Wen Bing*, stands as a defining feature of TCM. However, this trajectory of theoretical pluralism was not uniformly mirrored across all East Asian medical traditions. Despite sharing the common foundational framework of the *Shang Han* paradigm, different regions exhibited distinct evolutionary paths in their practical responses to epidemic threats. While China navigated through scholarly debates and paradigm shifts, other regions developed their own strategies tailored to their unique socio-political and clinical realities. The following section explores these divergences by examining the transformation of epidemic medicine in the Joseon dynasty, focusing on how it reconfigured universal medical knowledge into a distinct, state-centered tradition of *Onyeokhak*. This divergence in theoretical development suggests that while epidemic crises exposed the limits of the *Shang Han* paradigm across East Asia, the strategies adopted to address those limits were shaped less by medical doctrine alone than by broader institutional, political, and administrative contexts.

3 Joseon dynasty's perception of epidemics and the formation of *Onyeokhak*

3.1 Early developments: the rise of state-sponsored institutionalization of Joseon's indigenous *Onyeokhak*

In the early Joseon dynasty, the theory of *Shang Han* was actively received and institutionalized through

state-sponsored medical compilations. Major government-compiled texts such as *Hyangyak Jipseongbang* (「鄕藥集成方」 *Compendium of Native Korean Prescriptions*) (Fig. 1) and *Uibang Yuchwi* (「醫方類聚」 *Classified Collection of Medical Prescriptions*) (Fig. 2) which devoted independent sections to *Shang Han*, reflecting its continued authority as a foundational framework for understanding exogenous diseases. In particular, *Uibang Yuchwi* incorporated an extensive body of *Shang Han*–related materials transmitted from China, accounting for approximately 14% of its total contents. This demonstrates that Joseon medicine did not reject the classical *Shang Han* paradigm but instead accepted it as an authoritative theoretical foundation inherited from TCM.



Figure 1 *Hyangyak Jipseongbang* (「鄕藥集成方」 *Compendium of Native Korean Prescriptions*) (source with permission from: Jangseogak Archives, Academy of Korean Studies)



Figure 2 *Uibang Yuchwi* (「醫方類聚」 *Classified Collection of Medical Prescriptions*) (source with permission from: Jangseogak Archives, Academy of Korean Studies)

However, unlike the contemporaneous Chinese medical tradition—where engagement with *Shang Han Lun* increasingly took the form of philological exegesis, commentary, and theoretical debate—Joseon's reception of *Shang Han* knowledge was primarily practical and administrative in orientation. Rather than centering medical scholarship on the interpretation of the classical text itself, Joseon medical compilations selectively extracted clinically actionable content from comprehensive medical encyclopedias.[4] Within this pragmatic framework, epidemic phenomena—variously described as *Yeoklyeo* (疫疠 epidemics), *Sigi* (时气 seasonal plagues), or *Onyeok* (瘟疫 pestilence)—were repeatedly foregrounded, revealing a growing concern about the management of concrete epidemic crises rather than the refinement of abstract doctrine.

This practical emphasis eventually gave rise to Joseon's own institutionalized response to epidemics—*Onyeokhak*.[2] The origin of this academic subdivision can be traced to the early 16th century with the publication of concise epidemic-focused manuals such as *Gani Byeokonbang* (「簡易辟瘟方」 *Simplified Formulas for Preventing Epidemic Diseases*) (Fig. 3) and *Bunmun Onyeok Ihaebang* (「分門瘟疫易解方」 *Categorized and Easily Explained Prescriptions for Epidemics*) (Fig. 4). These texts compiled knowledge from foundational works like *Uibang Yuchwi*, *Hyangyak Jipseongbang*, and *Jeungnyu Boncho* (「證類本草」 *Classified Materia Medica*), aiming to provide accessible and operational treatment protocols during epidemic outbreaks.

Crucially, this trajectory was shaped not by scholarly debate or paradigm shifts, as in Ming–Qing China, but by the Confucian system of governance and state-led public health priorities in Joseon. Medical texts were commissioned with an explicit emphasis on public



Figure 3 *Gani Byeokonbang* (「簡易辟瘟方」 *Simplified Formulas for Preventing Epidemic Diseases*) (source with permission from: National Hangeul Museum)

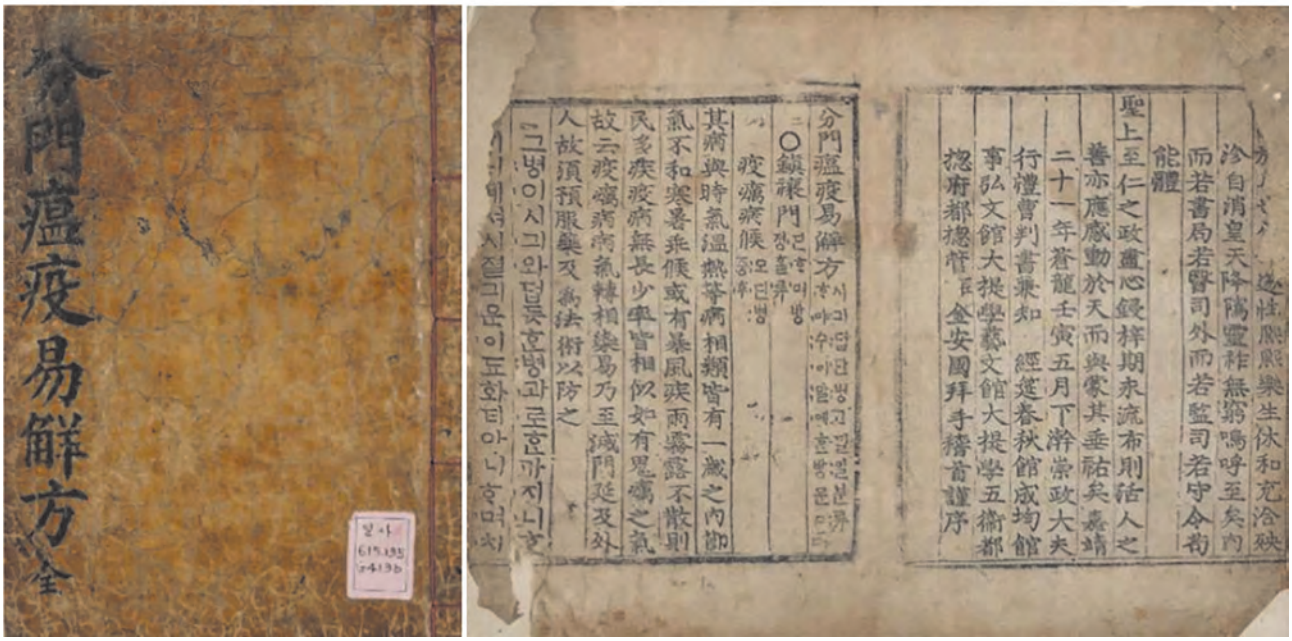


Figure 4 *Bunmun Onyeok Ihaebang* (「分門瘟疫易解方」 *Categorized and Easily Explained Prescriptions for Epidemics*) (source with permission from: Kyujanggak Institute for Korean Studies, Seoul National University)

dissemination, targeting commoners and local practitioners rather than elite physicians.[5] To ensure practical accessibility under conditions of scarcity, these texts often prioritized simplified therapeutic strategies, including the use of single-herb prescriptions (单方), over complex compound formulas.

In this particular sense, the early form of *Onyeokhak* did not operate as a comprehensively elaborated theoretical system to a great extent. Instead, it served more as a practical and expedient response to the urgent public health needs of the time. Nevertheless, it established an institutional framework through which epidemic knowledge could be codified, disseminated, and operationalized across administrative levels. This framework laid the foundation for the subsequent refinement and differentiation of epidemic medicine in the Joseon dynasty, enabling *Onyeokhak* to develop into a distinct and durable medical tradition rather than remaining a transient policy measure.

3.2 Later developments: from practical manuals to a mature *Onyeokhak* tradition

3.2.1 Generalization and reconfiguration of epidemic knowledge

During the mid-to late Joseon dynasty, the institutionalization of *Onyeokhak* became increasingly systematized and refined. This development was shaped by continued exposure to Ming dynasty medical compendia—such as *Yi Xue Zheng Zhuan* (《医学正传》 *Orthodox Lineage of Medicine*), *Gu Jin Yi Jian* (《古今医鉴》 *Medical Mirror of the Past and Present*), and *Wan Bing Hui Chun* (《万病回春》 *Restoration of Health from the Myriad Diseases*)—as well as by Joseon's own growing tradition of compiling medical manuals specifically devoted to epidemic disorders. Through this dual process of textual transmission and selective adaptation, epidemic disorders (*Onyeok*) came to be more clearly demarcated as an independent subject, distinct from *Shang Han*, in medical texts such as *Uirimgwaryo* (「醫林撮要」 *Essentials of the Medical Forest*) and *Donguibogam*.

Donguibogam, in particular, illustrated the Joseon dynasty's reconfiguration of Chinese medical paradigms. Rather than treating *Shang Han* as an autonomous category, it repositioned *Shang Han* content under the broader entry for *Han* within the *Liu Yin* framework. This editorial decision suggests an interpretive reorientation that subsumed *Shang Han* theory within a broader understanding of internal bodily conditions, aligning it more closely with the domain of internal medicine (内伤).[6,7] One illustrative example of this perspective can be found among Joseon medical scholars influenced by *Donguibogam*, who interpreted "cold damage affecting both yin and yang channels (两感伤寒)" as a condition arising when cold pathogens invaded a body weakened by kidney deficiency following excessive sexual activity. In this reading, the external invasion of cold was rendered intelligible only in relation to an internally compromised bodily state.

In contrast, epidemic diseases with clearly exogenous and collective characteristics were not easily incorporated into this internal-damage–oriented framework. Due to their exceptional nature, rapid spread, and the fact that individuals could not respond to them independently through personal cultivation or treatment, epidemic illnesses continued to be treated as a distinct

category. This conceptual separation underscores that the differentiation of *Onyeok* in Joseon medicine did not stem from theoretical incapacity, but from a recognition that certain pathological phenomena exceeded the explanatory scope of internal medicine and required a fundamentally different mode of response.

3.2.2 Dokyeok and disease-specific differentiation

The divergence discussed above prompted renewed state-led efforts to respond to epidemic outbreaks. Renowned court physician Heo Jun (许浚, 1539–1615), following the completion of *Donguibogam*, was tasked with drafting new manuals to address contemporary epidemics. He revised earlier texts such as *Gani Byeokonbang*, incorporating accumulated practical experience and emergent symptomatology to produce *Sinchan Byeokonbang* (「新纂辟瘟方」*Newly Compiled Manual for Epidemics*) (Fig. 5). While this work retained the general orientation of earlier epidemic manuals, it also reflected an increasing sensitivity to clinical variation and the limitations of standardized responses.[8]

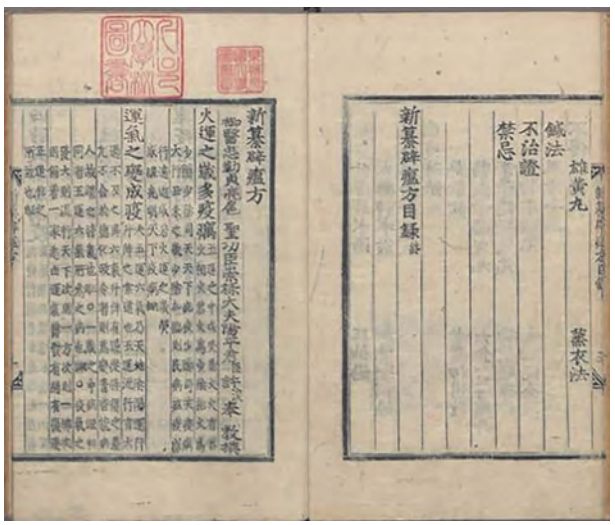


Figure 5 *Sinchan Byeokonbang* (「新纂辟瘟方」*Newly Compiled Manual for Epidemics*) (source with permission from: Kyujanggak Institute for Korean Studies, Seoul National University)

In response to unfamiliar and particularly virulent epidemic patterns, Heo Jun subsequently authored *Byeokyeok Sinbang* (「辟疫神方」*Divine Prescriptions for Epidemics*) (Fig. 6). Central to this text is the identification of *Dokyeok* (毒疫 toxic epidemic) as a distinct pathological category. *Dokyeok* was characterized by acute onset, the appearance of distinctive rashes (疹), rapid disease progression, and exceptionally high mortality rates.[9] These features were repeatedly emphasized to distinguish it from ordinary epidemic disorders, indicating that existing categories were insufficient to capture the severity and clinical behavior of this condition.

Importantly, the differentiation of *Dokyeok* was not the result of abstract theoretical reconstruction or a systematic reclassification of disease categories. Instead, it emerged from close and sustained attention to observable symptoms, disease course, and therapeutic urgency. By isolating rash as the defining clinical marker and interpreting the disease mechanism in terms of intense internal heat and toxicity, Heo Jun delineated a diagnostic framework that could not be fully accommodated within inherited *Shang Han* or epidemic paradigms, while remaining consistent with the pragmatic, experience-oriented orientation of Joseon medicine.[9] In this sense, *Dokyeok* functioned as both a practical and conceptual boundary case, exposing the limits of existing explanatory models.

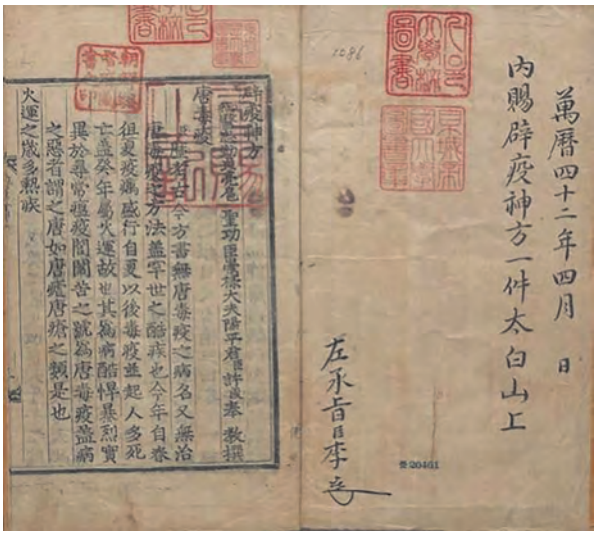


Figure 6 *Byeokyeok Sinbang* (「辟疫神方」*Divine Prescriptions for Epidemics*) (source with permission from: Kyujanggak Institute for Korean Studies, Seoul National University)

By the mid-17th century, further manuals such as *Byeokon Sinbang* (「辟瘟新方」*New Manual for Epidemics*) (Fig. 7) had emerged. These later texts were more compact in format, but built explicitly upon the



Figure 7 *Byeokon Sinbang* (「辟瘟新方」*New Manual for Epidemics*) (source with permission from: Kyujanggak Institute for Korean Studies, Seoul National University)

accumulated expertise of earlier works. They featured increasingly sophisticated diagnostic principles, more complex prescriptions, and deeper levels of theoretical reflection, including expanded discussions of pulse diagnosis and pathological mechanisms. Compared to early epidemic manuals, these texts demonstrated that Joseon epidemic medicine continued to develop through processes of iterative refinement, rather than remaining static or being shaped solely by state policy.

Despite its pragmatic origins, epidemic medicine in the Joseon dynasty developed through a highly dynamic process of adaptation and consolidation. Rather than constituting a marginal or underdeveloped branch of traditional medical learning, *Onyeokhak* emerged as a responsive and increasingly systematized field, drawing upon locally grounded clinical experience while selectively assimilating medical knowledge transmitted from abroad. This trajectory illustrated that the development of epidemic medicine in Joseon was shaped not by theoretical deficiency, but by context-sensitive choices grounded in state governance, clinical necessity, and public health concerns.

4 Joseon dynasty's *Onyeokhak* in the context of East Asian medical traditions

The previous sections have illustrated how the Joseon dynasty developed a distinct tradition of epidemic medicine (*Onyeokhak*) through state-driven compilation of practical manuals. This section explores the defining features of *Onyeokhak* by contrasting it with the contemporaneous Chinese *Wen Bing* tradition that emerged during the Ming and Qing dynasties.

Structurally, *Onyeokhak* arose as a form of official medicine, developed through royal commissions and intended for public application. Manuals such as *Sinchan Byeokonbang* and *Byeokyeok Sinbang* were produced not primarily for scholarly discourse but for direct utilization by commoners, local physicians, and relief agencies. These texts were frequently written in vernacular Korean (谚解 Eonhae) and prioritized simple, accessible remedies, often relying on single-herb prescriptions. Their content was concise and intentionally directive, offering generalized therapeutic principles such as promoting perspiration in early stages or inducing diarrhea in later stages. This prescriptive clarity enabled swift decision-making during public health crises.[10]

In contrast, the Chinese *Wen Bing* theory emerged from clinical debates among physicians and was grounded in accumulated empirical experience. Its framework emphasized individualized diagnosis and theoretical depth, often elaborated through complex case studies. While *Wen Bing* scholars treated *Wen Yi* as a subset, their primary concern lay in refining heat-based disease theories and pathogenesis.

As a result, *Onyeokhak*'s development was marked less by doctrinal contestation and more by its institutional role in health governance. Unlike the *Wen Bing* scholars, physicians in the Joseon dynasty rarely challenged the *Shang Han* paradigm outright. Instead, *Onyeokhak* was carved out as a specialized response to infectious outbreaks—practically distinct from internal disorders and theoretically adjacent to but not conflicting with *Shang Han*.

Notably, the diminished emphasis on *Shang Han* studies in the late Joseon dynasty has led some scholars to characterize Korean medicine as lacking a robust *Shang Han* tradition.[11] Reasons cited include the relative scarcity of *Shang Han Lun*-based prescriptions in Joseon materia medica and their gradual exclusion from civil service examination subjects. However, such interpretations may overlook how Joseon dynasty medicine internalized *Shang Han* principles within its broader theoretical ecology. For example, *Donguibogam* subsumed *Shang Han* under the *Liu Yin*, interpreting it through the lens of internal and seasonal factors. In this context, *Onyeok* diseases, which resisted such integration, were instead addressed through a distinct corpus of state-sponsored manuals.

Compared to the paradigm shifts seen in Ming–Qing medical debates, the formation of *Onyeokhak* in the Joseon dynasty was remarkably seamless. It emerged without sharp theoretical rupture, organically differentiating itself from *Shang Han* and aligning with state needs. While both *Onyeokhak* and *Wen Bing* redefined how external diseases were understood, the former was shaped by bureaucratic utility, the latter by intellectual contestation.

That said, it would be reductive to characterize *Onyeokhak* solely as a passively formed, policy-driven subfield. While early epidemic manuals in the Joseon dynasty featured little theoretical content, they typically attributed the causes of epidemics to abnormal seasonal or climatic changes. This explanatory model aligned with prevailing doctrines in mainstream traditional medicine, and treatments were accordingly differentiated by season or environmental conditions.

However, later *Onyeokhak* texts exhibit notable shifts. Although they continued to acknowledge unusual climate patterns, these references were increasingly de-emphasized, and a growing recognition emerged that hot weather was a principal factor in epidemic outbreaks. At the same time, these texts took a more analytical approach to symptomatology, proposing pathophysiological interpretations and symptom-based treatment principles. Recognizing that symptoms initially manifest on the body's exterior and gradually penetrate inward, physicians formulated therapeutic strategies based on the progression of visible signs. This framework also allowed them to respond to previously unknown epidemics by observing symptom patterns, inferring disease mechanisms, and establishing provisional treatment principles.

Another key development was the gradual elimination of references to *Zhang Yi* (瘴疫), a type of endemic

febrile disease associated with the southern regions of China. Although early Joseon dynasty epidemic manuals had included remedies for *Zhang Yi*, such content was later excluded—presumably because such tropical diseases were not prevalent in the Korean Peninsula. In their place, new prescriptions focused more heavily on clearing heat-related symptoms, often through single or compound herbal remedies tailored to the region's needs. This editorial selectivity reflects a deliberate, context-sensitive approach to medical compilation.

Although *Onyeokhak* and *Wen Bing* developed in different contexts, the former displays early signs of theoretical convergence with the latter. For instance, the shift from attributing epidemics solely to latent, hidden qi to identifying warm or damp-heat pathogens as the primary cause echoes a central paradigm in *Wen Bing* theory. Similarly, the emerging distinction between warm-heat diseases and damp-heat syndromes aligns with core features of Chinese warm disease scholarship. The fact that these conceptual elements surfaced independently in the Joseon dynasty—without direct influence from Chinese *Wen Bing* texts—underscores the dynamic and adaptive evolution of *Onyeokhak* in response to domestic clinical realities.

Therefore, *Onyeokhak* represents a uniquely Korean synthesis of practicality and institutional mediation. It functioned not merely as a policy tool but also as a dynamic framework that evolved in response to empirical needs, public accessibility, and selective incorporation of external ideas.

5 Conclusion

This study has argued that Joseon's *Onyeokhak* represents a distinct mode of epidemic medicine, one that developed through state mediation and practical exigency rather than scholarly theoretical reform. By tracing how epidemic knowledge was conceptualized, institutionalized, and refined in Joseon, and by comparing this trajectory with the emergence of *Wen Bing* theory in Ming–Qing China, the paper has moved beyond descriptive comparison toward an interpretive understanding of how different forms of epidemic medicine took shape within a shared classical tradition.

Rather than emerging as a derivative or underdeveloped counterpart to Chinese *Wen Bing* theory, *Onyeokhak* developed as a state-mediated and practice-oriented medical framework shaped by recurrent epidemic crises and structural constraints on medical resources. While Chinese physicians responded to the limitations of the *Shang Han* paradigm through scholarly debate and theoretical reconstruction, Joseon epidemic medicine advanced through administrative necessity, clinical immediacy, and institutional coordination. These contrasting trajectories demonstrate that epidemic medicine in East Asia did not follow a single linear path toward theoretical refinement, but instead developed through multiple adaptive strategies conditioned by local governance structures and social priorities.

From a historical perspective in the long term, the divergent modern trajectories of epidemic medicine in Korea and China are better understood as the outcome of institutional path dependencies rooted in these earlier configurations. In Korea, the colonial period and subsequent regulatory architecture produced a biomedicine-centered public health system, within which traditional medicine had limited institutional channels for incorporation into epidemic guidelines and command structures. In contrast, in China, traditional medicine retained policy interfaces that facilitated its periodic inclusion in national clinical guidance (e.g., during SARS and COVID-19). In both contexts, demonstrable utility in practice appears to have been a salient factor shaping policy incorporation.

Even so, historical features of the Joseon dynasty's *Onyeokhak* remain translatable as design principles for contemporary preparedness:

1. a rapid-update pipeline for standardized epidemic manuals;
2. syndromic, stepwise algorithms for early decision making;
3. region-specific adaptation modules keyed to climate and prevailing symptoms;
4. plain-language communication (vernacular gloss) for non-specialists; and
5. an evaluation–feedback loop to iteratively refine guidance.

Adapting such principles within a modern evidence and regulatory framework may help to complement existing biomedical protocols and improve surge responsiveness. In this sense, the value of *Onyeokhak* lies less in direct therapeutic transposition than in organizational and implementation heuristics that remain relevant to public health today.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

Sanghyun Kim participated in research design and writing of the paper.

Conflicts of interest

The author declares no financial or other conflicts of interest.

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Original Article

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The Treatment of Low Back Pain from the Dual Vision of Traditional Chinese Medicine and Thai Medicine

Aucharee Fungfukitjakarn[1], RONG Jiaqi (戎嘉琦)[1], YUAN Wei'an (元唯安)[1,✉]

Abstract

The number of patients with low back pain has increased due to changes in living and working habits. It has become one of the most common diseases in Chinese and Thai clinics. Treatment with Thai traditional medicine can effectively alleviate and manage low back pain. This paper aims to summarize the clinical efficacy and distinctive features of Thai traditional medicine (TTM) in managing low back pain. By reviewing recent literature on TTM treatments, including Thai massage, herbal hot massage, and Thai herbal medicine, the paper aims to lay a foundation for TTM treatment in the world and to promote the convergence and development of traditional Chinese and Thai traditional medicine treatment. Additionally, it advocates for the integration and advancement of both Chinese and Thai traditional medical practices, while also encouraging the dissemination of traditional medicine to other countries globally.

Keywords: Low back pain; Thai medicine; Thai massage; Hot compress; Thai herbal medicine; Traditional Chinese medicine

1 Introduction

Low back pain is a very common problem among the working age population all over the world, and the number of sufferers is increasing over time as most of the occupations are farmers and office workers with a sedentary lifestyle. The number of people of all ages suffering from low back pain has been increasing since 1990. It is estimated that by 2050, more than 800 million people worldwide will be affected by low back pain with the highest increase in Asia and Africa. There were 619 million people worldwide suffering from low back pain in 2020. Moreover, there were 69 million years lived with disability (YLDs) were caused by low back pain in 2020, accounting for 8.1% of all YLDs globally.[1]

Thailand exhibits a relatively high prevalence of low back pain among its population. Studies show that up to 80% of patients suffer from low back pain, and 50% of patients suffer from chronic pain, especially muscle pain in the lower back and herniated discs in the lumbar spine. Low back pain can be caused by a variety of reasons. For example, age, joint degeneration, inflammation of muscles and muscle building, as well as osteoporosis.[2,3] Low back pain usually gets better with rest, and other treatments for low back pain depend on the cause. They include: medications, physical therapy, hands-on manipulation, injections, and surgery. When taking medications, if they are taken in large quantities or over a long period of time, all medicines can cause unwanted side effects, such as headache, indigestion, nausea and dizziness.[4,5] Therefore, more and more patients are now interested in alternative medicine, whether it is traditional Chinese medicine (TCM) or Thai traditional medicine (TTM), which are mainly aimed at preventing and treating diseases. They can help improve blood circulation, achieve pain relief, muscle relaxation or even healing and avoid the adverse effects of long-term oral medication or surgical treatments.[6]

TTM has a profound historical foundation deeply rooted in indigenous knowledge, which has evolved over a millennium through the integration of diverse medical systems, including Indian Ayurveda, TCM and Khmer traditions. Its theoretical framework revolves around the balance of the four elements—earth, water, wind, and fire—aiming to harmonize the body and mind through unique energy pathways called *Sen* lines (*Sen* means "meridian", "path" or "channel"), which parallel TCM's meridians. Over centuries, TCM significantly influenced TTM through the introduction of diagnostic techniques such as pulse and tongue diagnosis, herbal pharmacology,

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and therapeutic practices like reflexology. Historical exchanges, particularly during the 13th to 18th centuries, witnessed Chinese physicians serving in the Thai royal court, which cemented the integration of TCM into Thailand's medical landscape. Despite these shared influences, TTM maintains its distinctiveness by combining foreign traditions with local beliefs, creating a holistic and multifaceted medical system.[7] Moreover, TCM and TTM both have deep cultural roots and long histories that influence their principles, diagnostic methods, and treatment techniques. Although they share commonalities as holistic systems of healing, their differences are shaped by distinct cultural, environmental, and philosophical influences. They have a relatively wide range of treatments, not only for diseases and pain, but also to regulate the balance of the whole body. In Thailand, the treatment of low back pain is able to balance the body, mind and will be effective for qi and blood circulation from the accumulation of medical experiences and after the theoretical summary of the formation of Thai massage, herbal hot massage, as well as Thai medical herbs.[8–10] The treatment of low back pain is one of the characteristics of the medical treatment. In comparison, TCM employs modalities such as acupuncture, cupping, and *Tui Na* (推拿) massage, all of which are directed at unblocking energy channels and promoting systemic harmony. These approaches reflect the respective cultural philosophies underpinning each system and their shared commitment to holistic healing.[11]

2 Thai medicine's understanding of low back pain

For low back pain,[12] Thai doctors consider it to be one of the areas within the scope of Lom Plai Pat Ta Kad (Myofascial Low back pain), called Lom Plai Pat Ta Kad low back signal 1 and signal 3 (signal refers to the fixed pressure point). They refer to the excessive use of muscle and lead to a reduction in blood flow in the local area, resulting in muscle tightness, narrowing of the blood vessels, muscle localized pain and other symptoms. Clinical manifestations of lumbar pain can also be seen in the back of the thigh pain and numbness, knee joint weakness, etc.[13]

Factors causing low back pain or muscle soreness include incorrect posture or keeping the same posture for a long time, incorrect body movements, and excessive use of muscles. Accidentally damage to the muscles and bones of the body as well as lack of care and management of muscles in preparation for use could also cause low back pain. In addition, other factors may change the internal system of the body, such as hormone system. Low thyroid hormone levels or high cortisol levels, and nutritional imbalance such as calcium, potassium, vitamin C, and iron may all lead to low back pain.[14]

In diagnostic methods, TCM employs detailed assessments such as pulse diagnosis, tongue observation, and *Bian Zheng* (辨证 pattern differentiation) to identify imbalances, tailoring treatments to address qi deficiencies or stagnation.[15] TTM relies on palpation and tactile feedback to detect blockages along *Sen* lines, with treatments often based on the practitioner's expertise and cultural practices. Philosophically, TCM seeks to harmonize internal and external forces to prevent recurrence, while TTM integrates physical, emotional, and spiritual healing, emphasizing relaxation and mindfulness in recovery.[16]

According to the physiological theory of TTM, physical ailments including back pain are caused by a lack of balance of the four elements in the body. Therefore, according to the ten main meridians theory of TTM as well as the four elements theory of Thai medicine, Thai massage, herbal hot massage or the use of herbs taken internally are able to relax the muscles, improve the blood circulation, balance the four elements in the body and be able to alleviate the disease as well as promote health.[17–18]

2.1 Four elements theory of Thai medicine

Thai medicine believes that there are wind, earth, water and fire in the natural world, and the human body is also composed of the "four elements" of wind (qi), water (blood), fire and earth. Depending on the date of birth, each person has a unique element called the "life element". If the four elements of the body are balanced, the body will be healthy; if the four elements are not balanced, the person will be sick.[19]

According to the four element theory, the elements in the body that are affected by low back pain are as follows. The earth element consists of muscles and tendons. The water element consists of blood. The wind element consists of wind (wind blowing from below to above, from above to below, and all over the body). The fire element consists of warm fire. This can be explained by the fact that when the body is in an inappropriate position or remains in the same position for a long period of time, the muscles become overactive, which results in spasms. The earth element in the body begins to erect, preventing the movement of the water and wind, which tends to affect the fire element in the area, resulting in an increase in the temperature of the skin and inflammation of the muscles in the area. The lack of the water element prevent the moving of wind element, resulting in insufficient blood supply to the peripheral organs which can lead to numbness. Finally, when the earth element lacks the nourishment of water, and there will be an excess of the wind element in the area, and the earth will become more hardened. Too much wind element in one area, or what is called "qi stagnation (气滞)" in traditional Thai terminology, will leads to pain and stiffness in the muscles of the patient in that area.[20–22]

2.2 The theory of the "ten main meridians"

The theory of the "ten main meridians" is fundamental to TTM, emphasizing the role of energy pathways in maintaining physical and spiritual balance. According to

this theory, the human body comprises 72,000 energy lines responsible for transporting and distributing *Lom Pran* (vital energy or qi), an essential substance for sustaining life and its processes. However, only ten of these lines are regarded as primary and significant, forming the foundation of the "ten main meridians" theory (Fig. 1). Ancient Thai doctors identified these meridians through extensive clinical practice, using them to guide diagnosis and treatment. In practice, doctors assess the patient's symptoms and the locations of pain to determine whether these are associated with the ten primary meridians. Treatment methods then focus on restoring energy flow and addressing blockages along these meridians, which are considered essential for the body's holistic health.[17]

In Thailand, the "ten main meridians" are called the *Sen Prathan Sib*. *Sib* is the Thai word for "ten" and *Sen* is the Thai word for "meridian", "channel", or "pathway", which is invisible, and *Prathan* means "primary". Each line is associated with distinct therapeutic effects on the body; however, within the framework of TTM, the *Sen Prathan Sib* are understood to function collectively as an integrated system. They have three important components: 1) meridians: the ten main meridians, which have certain running routes; 2) meridian qi (wind): meridian qi that operates in the meridians; 3) meridian points: the meridian points are similar to Chinese acupuncture points and located along the meridian route throughout the body which can be stimulated by certain techniques to produce a favorable effect on the patient's symptoms. Certain stimulation techniques will produce a sense of getting qi, or even the feeling of launching along the meridians and for the human body to feel relief from discomfort, diseases, or complicated conditions.

The ten main meridians include ITHA, PING GALA, SU MANA, KALA THAREE, SAHAT SARANGSI, TAWAREE, CHANTA PUSANG, RUCHAM, SIKKHINI and SUKUMANG. The circulation of both TTM and TCM meridians have passed through some of the body's internal organs, and can treat the corresponding internal organs of the disease, but there is no connection between TTM meridians and internal organs, while the TCM meridians link together to unify all the viscera, organs, orifices, muscles, skin and bones in the human body into an organic whole.[23–26]

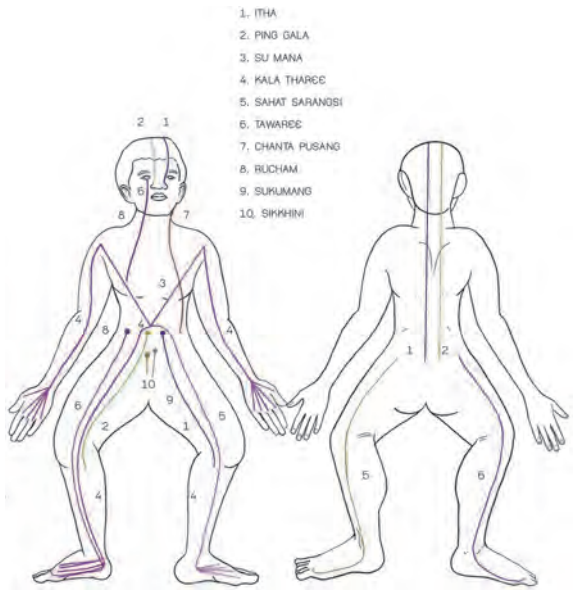


Figure 1 Ten main meridians (*Sen Prathan Sib*) (source with permission from: picture made by the authors)

3 Treatment of low back pain in Thai traditional medicine

3.1 External treatments for low back pain

3.1.1 Thai massage

Both Chinese *Tui Na* and Thai massage have a similar concept, that is, massaging along the meridians can help to relieve muscular tensions, modulate neuromuscular functions, and reduce pain. Thai massage, originating in ancient India, is a traditional treatment method aimed at preventing and restoring the body's condition. It is based on the concept of the "ten main meridians" and incorporates knowledge of human anatomy and physiology. This approach bears some similarity to both TCM meridians and Kundalini Yoga principles. Thai massage is divided into two types, Thai ordinary traditional massage and Thai royal massage, each with different special operating techniques and therapeutic purposes. Thai royal massage is inherited by the Thai royal massage practitioners. Currently the royal traditional massage dominates the Thai massage, and it is more widely recognized for Thai massage treatment. Another traditional massage originating from the countryside and has been passed down orally from master to disciple in a more informal and personalized manner.[27,28] There are six methods, namely: point (pressure) method, kneading method, push method, split knock method, step (kneeling) method, the movement of joints method. In addition to the use of both hands, other body parts such as elbows, knees, and feet are also employed, whereas Chinese *Tui Na* is primarily performed using the hands. Currently, Thai royal massage is commonly used in clinical practice.[29,30]

TCM classifies acupoints into three categories, namely: meridian points, extra meridian points (经外奇穴), and *Ah Shi* points (阿是穴), with a total of 361 points. There are two classifications of massage points in TTM. The first is the system of massage points in the main body, known as the "ten main meridian points"; another type of points is signal points which are commonly used in Thai royal massage.[31–36] The "ten main meridian points" are different from the twelve meridians in TCM. Their clinical pathways and functions are closer to those of the TCM concept of meridians and collaterals. This system comprises 276 acupoints, each with a fixed name and location. Distributed along the courses of the ten primary channels, these points are closely related to the

meridians and can reflect pathological conditions such as pain and red spots.

When treating low back pain, there are four main steps involved: a basic massage on the side of the leg and the instep, opening the air gate at the inguinal region, a basic massage of the back, and signal points at the low back area (Fig. 2). This procedure is more effective than direct massage of the low back because these four procedures will support each other to maximize the effectiveness of treating low back pain.[37,38]

3.1.2 Herbal hot massage

Herbal hot massage is one of the common features between Thai herbal medicine and Thai massage. After the massage, it is usually followed by a herbal hot massage in order to obtain better therapeutic results. The most interesting herbal massage is called *Luk Pra Kob* (Fig. 3), which means hot packs containing essential oils of herbs. The herbs are usually steamed in a pot and heated, and then the packs are placed directly on the patient's skin or on the patient's body through clothing and massaged along the meridians so that hot pressure is applied, especially to areas that cannot be treated with massage. Hot massage is very effective for low back pain, internal organ disorders, skin disorders, headaches, etc. It helps to promote blood circulation, reduce swelling, reduce muscle inflammation, relieve body pain, and it has a relaxing effect on a person's body and mind at the same time.[39]

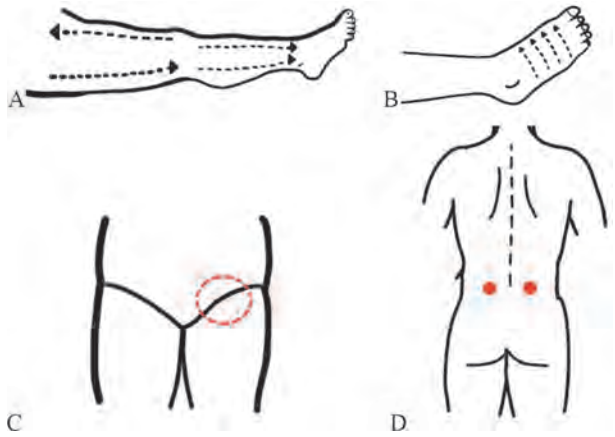


Figure 2 Steps in the treatment of low back pain. A Basic massage on the side of the leg; B Basic massage of the instep; C Opening the air gate at the inguinal region; D Signal points at the low back area (source with permission from: pictures made by the authors)



Figure 3 Herbal ball (Luk Pra Kob) (source with permission from: picture made by the authors)

When treating low back pain, the frequently used formula from "Thai herbal medicine"[40] is based on wind dispelling, heat-clearing, phlegm-reducing, laxative herbs and herbs to disperse blood stasis and promote blood circulation. Wind dispelling herbs include lemongrass [Cymbopogon citratus (DC.) Stapf.], bitter sambucus (Kaempferia marginata Carey ex Roscoe), sankasamona ginger (Zingiber cassumunar), stinky vetch [Arivela viscosa (L.) Raf.], etc.; heat-clearing herbs include seashore MUBARAK (Morinda citrifolia L.), tamarind (Tamarindus indica L.), etc.; phlegm-reducing herbs include acacia [Acacia concinna (Willd.) DC.], etc.; laxative herbs include aloe vera [Aloe vera (L.) Burm. f.], etc.; and herbs to disperse blood stasis and promote blood circulation include concave-lipped ginger [Boesenbergia rotunda (L.) Mansf.] and turmeric (Curcuma longa L.). Moreover, these herbal hot packs also contain salt and camphor.[41–42]

3.2 Internal treatment of low back pain: Thai herbal medicine

Both TCM and TTM place significant emphasis on the utilization of natural remedies, particularly herbal medicine. In TCM, herbal formulations are meticulously developed to restore balance to the body's energy system, addressing specific patterns of imbalance. Conversely, TTM is characterized by its emphasis on healthcare through herbal remedies aimed at maintaining bodily balance.[43] It is mainly based on four elements rather than the organ system. In addition, according to TTM, many diseases are signals of improper physical behaviors, reflecting imbalance of the body and reminding people to adjust their lifestyles in order to restore the body to balance, it also considers various aspects of the disease.

Thailand is in the tropics and has a high biodiversity of plant species, especially plant medicines. Currently, Thai herbal medicine is becoming more and more popular as it is an alternative medicine of Thailand's valuable wisdom since ancient times. The government encourages its widespread use in hospitals across the country and has seen the achievements of herbal medicine and emphasized its research and development, in addition to raising the level of production of herbal medicine in accordance with international standards.[44]

The Food and Drug Administration (FDA) of Thailand has enacted and enforced the Herbal Products (Act of B.E. 2019), under which herbal medicines are defined as natural products obtained from plants, animals, microorganisms, or minerals, which are transformed into herbal medicines.[45–47]

According to the principle of Thai pharmacy, before understanding the efficacy of a medicine, one should first understand the flavor of the medicine, as it shows the efficacy of the medicine. Regarding the taste of medicines, they can be divided into nine flavors: astringent, sweet, oily, salty, intoxicating, sour, bitter, pungent and cool. The flavors of herbs play a balancing role in the body. When the four elements in the body are balanced, a person will not get sick. If there is a lack of balance, one tends to get sick due to diseases caused by each person's health weaknesses. For example, illnesses caused by the earth element can be treated with astringent, sweet, oily, and salty herbs; illnesses caused by the water element can be treated with intoxicating, sour, and bitter herbs; illnesses caused by the wind element can be treated with pungent herbs; and illnesses caused by the fire element can be treated with cool herbs.[42,48] Therefore, in order to prevent the occurrence of diseases, the main auxiliary methods is the benefit from intaking the various flavors of plants, vegetables and fruits in our daily life, in comparison with the flavors of medicinal herbs, in order to be able to regulate the balance of the body, to prevent diseases and to be able to maintain good health.

For the treatment of low back pain, a formula called "Sahastara" is often used. The Sahastara remedy, a long-standing component of TTM, has been utilized in Thai medical practices for an extensive duration.[49] Moreover, the Sahastara remedy has shown to be a good alternative treatment with less side effects when it was compared to diclofenac, so it has been acknowledged and published in the Thai National List of Essential Medicine (NLEM).[50] The Thai NLEM states that the Sahastara is indicated for pain management in musculoskeletal disease.[51] Research has found that Sahastara is a formula made up of 21 herbs (Table 1) that can reduce muscle aches and pains in much the same way as the modern medicine Diclofenac.[52,53] Sixty percent of the Sahastara formula is made up of mainly hot and pungent herbs. Using warm herbs and heat clearing herbs enhances the effect of dispelling wind in order to relieve muscle pains, numbness in the limbs, relax tendon tension, and reduce cramps. There are also herbs in the formula which are for controlling the hot herbs in Sahastara. While some of these herbs are a bit hot, overall, they also have a cool, astringent, and bitter flavors. Thus, Sahastara works by increasing the flow of qi, be helpful for back and lower back pain, relaxing the lower body and reducing pain as well as refreshing the mind.[54]

In addition to the treatment guidelines for massage therapy and herbal dispensing, Thai traditional doctors also have advice on avoiding injurious foods that can trigger symptoms of the disease, including not eating glutinous rice, bamboo shoots, animal offal, and not drinking alcoholic beverages. Because the above foods may cause the level of uric acid in the blood to rise, forming urate crystals, which may lead to joint inflammation and pain.[55]

Table 1 Composition of the Sahastara formula

Thai Name	Chinese Name	Latin Name
Dee Plee	长果胡椒	Piper retrofractum Vahl.
Dok Chan	肉豆蔻	Myristica fragrans Houtt.
Has Sa Khun Tade	鹤鸪麻	Kleinhovia hospita Linn.
Jing Jor	掌叶鱼黄草	Merremia vitifolia (Burm. f.) Hallier f.
Jet Ta Mul Plerng Dang	紫花丹	Plumbago indica Linn.
Kote Kag Kra	芥菊	Anacyclus pyrethrum (L.) DC.
Kote Ka Mao	苍术	Atractylodes lancea (Thunb) DC.
Kote Kan Prao	胡黄连	Picrorhiza kurroa Benth.
Kote Pung Pla	诃子	Terminalia chebula Retz. (gall)
Ka Ra Boon	樟树	Cinnamomum camphora Linn.
Luk Chan	肉豆蔻	Myristica fragrans Houtt.
Ma Ha Hing	阿魏	Ferula assafoetida Linn.
Prik Thai	黑胡椒	Piper nigrum Linn.
Sa Mhor Thai	诃子肉	Terminalia chebula Retz.
Tong Tank	马前子	Baliospermum montanum Muell. A.
Tien Dang	家独行菜	Lepidium sativum Linn.
Tien Sut Ta But	茴芹	Pimpinella anisum Linn.
Tien Khao	孜然	Cuminum cyminum Linn.
Tien Dum	黑种草	Nigella sativa Linn.
Tien Ta Tuk Ka Tan	莳萝	Anethum graveolens Linn.
Wan Nam	菖蒲	Acorus calamus Linn.

China and Thailand have historically maintained close ties, with TTM significantly influenced by TCM. Despite similarities between these two traditional systems, TTM also incorporates a variety of herbs, some of which are shared with TCM.

4 Conclusion

Lower back pain appears to be a mild symptom, but if it is not corrected or properly treated, it will become a chronic problem. TTM offers an alternative option for individuals seeking to avoid modern medical interventions. In addition, using herbal therapy and royal massage therapy are also an option. The main purpose of traditional Thai massage is to treat, prevent and treat diseases and improve patients' symptoms. This is a very effective treatment and a conservation of TTM which is one of the unique characteristics of Thainess that will remain with Thailand forever.

Both TCM and Thai massage encompass a diverse array of treatments aimed not only at alleviating pain and symptoms, but also at restoring overall bodily balance. both traditional medicine systems boast unique theories, treatment modalities, and medicinal practices that warrant acknowledgment and comprehension. Additionally, both systems provide holistic and complementary approaches to managing low back pain, demonstrating

the value of traditional knowledge when combined with modern biomedical insights.

However, treatments for low back pain are only meant to treat muscle damage or relieve pain. The best way to prevent low back pain is through behavioral changes, adjusting work postures, improving physical and mental health, getting enough rest, reducing stress, maintaining good physical health, and reducing the occurrence of injuries in order to permanently have good productivity and quality of life.

TCM and TTM share similarities in their holistic approach to treating low back pain, emphasizing the restoration of energy flow and balance within the body. Both systems utilize herbal remedies and manual therapies, and are grounded in the concept of energy pathways—meridians in TCM and *Sen* lines in TTM. However, their theoretical foundations are different. TCM emphasizes the flow of qi (气) through 12 meridians, while TTM focuses on balancing the four elements and the *Sen Prathan Sib*. In practice, diagnostic methods also diverge, with TCM relying on pulse and tongue diagnoses to identify internal imbalances, while TTM focuses on assessing physical symptoms and the localization of pain. These distinctions highlight the unique yet complementary philosophies of both systems in addressing low back pain.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

Aucharee Fungfukitjakarn participated in the writing of the paper and creating the illustrations. Aucharee Fungfukitjakarn and RONG Jiaqi participated in the revising of the paper. YUAN Wei'an supervised the project.

Conflicts of interest

YUAN Wei'an is a Youth Editorial Board member of *Chinese Medicine and Culture*. The article was subject to the journal's standard procedures, with peer review handled independently of the Youth Editorial Board member, and his research groups.

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Original Article

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OPEN

Geographical Characteristics and Historical Evolution of the Longsha Medical School

GUO Zhen (过祯)[1], LU Shu (陆曙)[2,✉]

Abstract

From the perspective of historical geography, this study conducts an in-depth investigation into the heritage timeline, regional characteristics, and formative factors of Longsha medical school (龙砂医派 Longsha medicine). Tracing its origin to the Song Dynasty, Longsha medicine has been handed down through successive generations, with numerous renowned physicians such as Xu Shuwei (许叔微) and Lu Wengui (陆文圭) making remarkable contributions to its development. A combination of favorable geographical location, superior ecological environment, an open cultural atmosphere, abundant local medicinal resources, and the unique physical constitutions of the local population comprehensively shaped the school's distinct features and fueled its evolution. The core characteristics of Longsha medicine can be summarized as: emphasizing on inheritance and academic exploration, focusing on traditional Chinese medicine (TCM) classical theories and clinical practice, and embodying profound cultural connotations. As a regional and comprehensive TCM academic school, it originated in the Huashi area (historically known as Longsha) in Jiangyin County, Wuxi City, Jiangsu Province, gradually expanded to the areas surrounding Taihu Lake (太湖), and exerted far-reaching influence nationwide. Serving as a core representative of the TCM academic field in the Yangtze River Delta, Longsha medicine boasts a long history, solid cultural foundation, a galaxy of eminent physicians, classic works, distinct academic traits, unique diagnostic and therapeutic techniques, and vigorous dynamic inheritance. Contemporary in-depth research on Longsha medicine not only facilitates the dynamic inheritance of the core TCM theories such as *Wu Yun Liu Qi* (五运六气 the five movements and six qi theory) in *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*) but also verifies the effectiveness and scientific validity of TCM classical theories in guiding the prevention and treatment of modern diseases. Thus, the study helps to protect regional medical-historical sources, enrich the doctrinal landscape of TCM, sustain distinctive academic techniques, catalyzes contemporary innovation, cultivates characteristic TCM talent, and enhances clinical service effectiveness.

Keywords: Longsha medical school; Xu Shuwei (许叔微); Cheng Dan'an (承淡安); Historical geography; Academic schools; Traditional Chinese medicine

1 Introduction

Different traditional Chinese medicine (TCM) academic schools have distinct inheritance vein, unique clinical techniques and academic thoughts, which were formed due to their apprenticeship customs in history. In the period of sustaining live transmission, these schools gained certain historical influence and recognition. The history of TCM development has witnessed many academic schools. These schools have promoted the advancement of Chinese materia medica and are still profoundly influencing today's clinical diagnosis and treatment thinking. Ren Yingqiu (任应秋) explained two existing forms of one TCM academic school. One of them was formally or informally learning medical thoughts from masters, then inheriting and circulating them severally; another one was viewing differently in academics, spreading them and then influencing people separately (凡一学派之成立，必有其内在的联系。所谓内在联系，不外两端: 一者师门授受，或亲炙，或私淑，各承其说而光大之，一者学术见解之不一致，各张其立说，影响于人). [1] Among the existing TCM schools, the more familiar ones are the Medical Canon School (医经学派), the Classical Formula School (经方学派), the Shanghan School (伤寒学派 TCM medical school taking Zhang Zhongjing's *Treatments on Exogenous and Miscellaneous Internal Diseases* as clinical guidance), the Warm Disease School (温病学派), etc.

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In recent years, as TCM schools were thrown into the spotlight, some creative scholars proposed to construct an evaluation system containing multidimensional factors for geographic TCM academic schools.[2] Thus, new schools research from the perspective of historical geography was initially proposed. Now, Wumen school (吴门医派) and Qilu school (齐鲁医派) were deeply researched respectively from this angle by several scholars.[3–4]

Longsha medical school (龙砂医派), representing Longsha medicine, originated in Wuxi-Chengjiang district (锡澄地区), developed in the Song and Yuan dynasties, and prospered in the late Qing dynasty and the early period of the Republic of China. It was then revived in the contemporary era. In 2012, it was approved as one of the first batch of sixty-four national formal TCM schools by National Administration of Traditional Chinese Medicine.

There are three main features of Longsha medicine. The first one is attaching importance to the research on *Wu Yun Liu Qi* (五运六气 the five movements and six qi theory, clinical practice according to qi movement law of the nature) in *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*), which is characterized by good use of celestial controlling formulas. The second one is valuing the study of formulas in *Shang Han Lun* (《伤寒论》*Treatments on Cold Damage*), which is characterized by skilled clinical practice of *Fang Bing Ren* diagnostic and treatment system (方-病-人诊疗体系 Formula-Diseases-Patients Corresponding system) as well as *Kai He Shu* (开阖枢 pivots regulating qi movement in human body consisting of an opening pivot, a close pivot and a governing pivot) of *San Yin San Yang Kai He Shu* (三阴三阳开阖枢 the law of qi and blood movement in the body regulated by triple yin and yang pivots). The third one is paying attention to *Qi Sun Ba Yi Tiao Yin Yang* (七损八益调阴阳 Harmonizing yin and yang by reducing seven *Yang Qi*-consuming behaviors and increasing eight yin essence-reinforcing behaviors) and the *Shen Ming* theory [肾命理论 left-kidney and right-*Ming Men* (命门 vital gate)], which are characterized by a skilled application of *Gao Fang* (膏方 Oral thick paste made from condensed medicinal decoction) to keep health and *Zhi Wei Bing* (治未病 treating illness before it occurs) and by the technological innovation of oral solutions.

Longsha medical school compiled the first classical medical case book *Shang Han Jiu Shi Lun* (《伤寒九十论》*Ninety Discussions on Cold Damage*). In the Ming dynasty, under the influence of the cultural background, female doctor Tan Yunxian (谈允贤) wrote the specialized medical compendium *Nyu Yi Za Yan* (《女医杂言》*Clinical Records of a Woman Physician*). In the Qing dynasty, *Yang Ke Xin De Ji* (《疡科心得集》*Clinical Experience on Sores Department*) founded the TCM surgical experience school. Miu Wen (缪问) wrote *San Yin Si Tian Fang* (《三因司天方》*Formula Corresponding to the Five Movements and Six Qi, Human activities and Diseases*) on the basis of *Huang Di Nei Jing* and *Ben Cao Gang Mu* (《本草纲目》*The Grand Compendium of Materia Medica*) to discuss the clinical use of formulas and medicines according to the *Si Tian Yun Qi* (司天运气 celestial governance and qi movement theory or a theory about the phenomenon of the five movements and six qi in different seasons).

The research significance of Longsha medicine lies in preserving regional medical literature and historical records, enriching the theories of various TCM schools, transmitting its unique academic knowledge and clinical techniques, stimulating contemporary innovative vitality, cultivating distinctive TCM talents, and enhancing clinical efficacy ultimately. This paper aims to research and illustrate its historical context, regional characteristics, and the influencing factors during the process of its formation and development to provide reference for the following relative research and the practice of TCM cause.

2 Historical characteristics and theoretical formation of Longsha medicine

2.1 The foundation, development and flourishing: emergence of Longsha medicine and representative physicians

2.1.1 Song-Yuan foundation period: Xu Shuwei and Lu Wengui

Huashi county (华士县), located in Jiangyin city, known as a cotton town in ancient times, was colloquially called Huashu which means a cotton bazaar or a cotton-producing town. It was also alternatively named Longsha because it is located at the foot of Bailong Mountain (白龙山) and Sha Mountain (砂山). Fu Chai (夫差), king of State Wu (吴国) in the Spring and Autumn Period, planted flowers here. It was a famous town in the area south of the Yangtze River (Fig. 1).

Longsha medicine originated from the Song and Yuan dynasties. Xu Shuwei (许叔微) was an outstanding medical scholar in the Song dynasty. He lived in seclusion at Meiliang hermitage (梅梁小隐) near Mountain Maji (马迹山) for more than 10 years in the Taihu Lake area, Wuxi city (Fig. 2). In this period, he intently studied TCM to write medical books and practice medicine. He epitomized the thought of *Wu Yun Liu Qi* theory in *Huang Di Nei Jing* and the classical formulas in *Shang Han Lun*, becoming the founder of classical prescription school and the earliest famous practitioner of Longsha medicine.[5] After that, Xu profoundly influenced Longsha medicine's formation, and his medical thoughts shaped Longsha medicine's initial academic characteristics. Xu Shuwei's academic thoughts and clinical experience also influenced plenty of TCM medical scientists in the successive dynasties. Lu Wengui (陆文圭) was one of them. He lived in Longsha area for a long time and

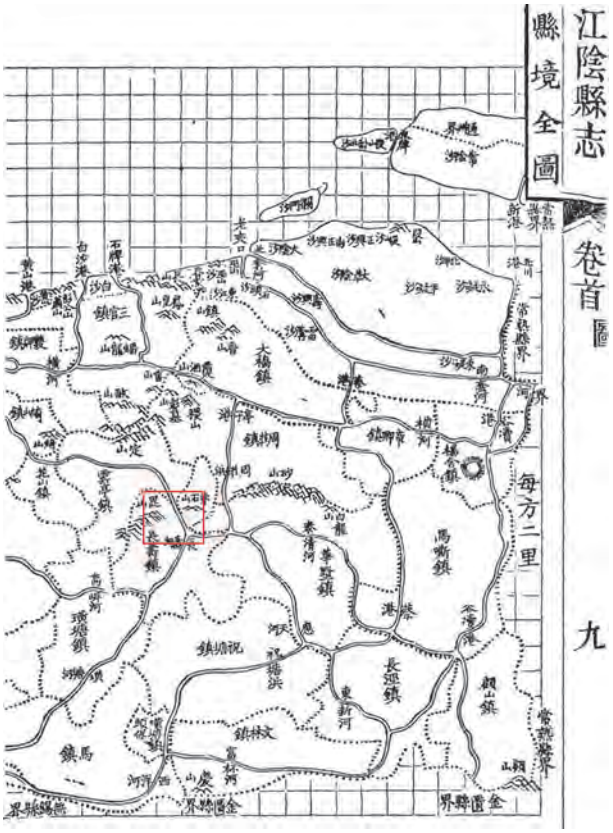


Figure 1 The Location of Bailong Mountain and Sha Mountain in *Jiang Yin Xian Zhi* (《江阴县志》*Chorography of Jiangyin County*), fourth year of Guangxu, Qing dynasty (source with permission from: National Digital Library of China)

was honored as the Southeast Great Master of TCM (东南宗师 great master of medicine in the Southeast part), reckoning Xu Shuwei to be an eminent doctor in the Taihu Lake area. Lu cultivated numerous cultural talents and TCM doctors who formed a core force in the formation and development of Longsha medicine afterwards. Thus, they were regarded as the origin generation of Longsha medicine and related medical culture.

2.1.2 Ming-Qing flourishing period: family lineages and regional reputation

After Xu Shuwei and Lu Wengui, famous doctors emerged generationally in Longsha area. By the late Yuan dynasty, there were Lyu Yiren (吕逸人), Tan Yunxian—one of the four famous female doctors in the Ming dynasty, Lyu Kui (吕夔) and his grandsons Lyu Yingzhong (吕应钟), Lyu Yingyang (吕应阳)—three of whom were imperial physicians. In *Zhengde* (正德) and *Jiajing* (嘉靖) periods of the Ming dynasty, plague was prevalent in the Taihu Lake area. Lyu Kui "made medicinal pills to cure numerous patients day and night (裹药囊日治百家，全活无算)". Thus, people called him Immortal Lyu (吕仙). Later, he was enrolled in *Tai Yi Yuan* (太医院 the imperial hospital for the emperor and his family), and then wrote a book called *Yun Qi Fa Hui* (《运气发挥》*Study on Qi Movement*). Zhuang Lyuyan (庄履严) was famous in the Wanli (万历) period of the Ming dynasty. *Jiang Yin Xian Zhi* (《江阴县志》*Chorography of Jiangyin County*) recorded that he wrote a book called *Yi Li Fa Wei* (《医理发微》*Medical Theories*) in which *Yun Qi Zhuan Lun* (《运气专论》*Medical theory about Five Movements and Six qi*) was at the second chapter and *Shang Han Zhu Zheng* (《伤寒诸证》*The Patterns of Cold Damage*) was the third. These talented doctors and medical books demonstrate the inheritance of Longsha medicine's academic thoughts.

In the Qing dynasty, groups of well-known doctors were formed to exert a far-reaching influence from the center Huashu. These groups were partly similar in academics. They possessed unique medical theories and skills in treating certain diseases, inherited from families or masters. They greatly enriched Longsha medicine due



Figure 2 Xu Shuwei's Meiliang hermitage near the Taihu Lake (source with permission from: photo taken by the authors)

to their therapeutic advantages and distinct characteristics. In the first year of Jiaqing (嘉庆) period of the Qing dynasty, Kong Guangjyu (孔广居) described in *Tian Xu Jiang Gong Zhuan* (《天叙姜公传》*Records of Master Jiang Tianxu*) that Huashu was about 25 kilometers away from the city, located behind Bailong Mountain and Sha Mountain with *Tai Qing Yi Shui* (泰清一水 a river stretching under the vast sky like a ribbon) to the front. Generations of famous doctors arose from the lovely scenery, and many people from the surrounding areas came here to seek medical treatment.

The Jiang family practiced medicine for generations. The Jiang's medical lineage was one of the most representative TCM schools in Longsha area. In the late Ming dynasty, the first generation of the family, Jiang Yutian (姜玉田), practiced medicine under the guidance of Confucianism and founded the Jiang family's medical legacy. Jiang Tianxu (姜天叙), the second generation, wrote *Feng Lao Gu Ge Si Da Zheng Zhi* (《风劳臌膈四大证治》 *Treatments on Four Patterns: Wind Stroke, Consumption, Tympanites and Dysphagia*). Jiang Zongyue (姜宗岳) and Jiang Zonglu (姜宗鲁) were the third generation, and the latter one wrote *Long Sha Yi An* (《龙砂医案》 *Longsha Medical Records*). Jiang Tiqian (姜体乾), the fourth generation, could cure diseases that even the eminent doctor Ye Tianshi (叶天士) could not cure. Jiang Dayong (姜大镛), the fifth generation, was honored with the title of *Jiang Shang Yang Chun* (江上阳春 warm spring on the river), indicating his medical skills were superb. Jiang Xuehai (姜学海), Jiang Qiwei (姜起渭) and Jiang Xingyuan (姜星源) were the sixth generation contributing to the family's medical cause. Although Jiang Jichang (姜继昌), the later generation, engaged in teaching, his daughter Jiang Huailing (姜怀琳) married Cheng Dan'an (承淡安) (Fig. 3), the successor of the Cheng family's medical practice. She absorbed his medical thoughts on the basis of inheriting Jiang's medicine. After the establishment of the People's Republic of China, she went to work in Jiangsu Provincial Hospital of Chinese Medicine and spread Longsha and Jiang medicine at the same time.

In the Guangxu (光绪) period, doctor Jiang Chengzhi (姜成之) in Suzhou province wrote *Long Sha Ba Jia Yi An* (《龙砂八家医案》*Consilia of Eight Medical Families*) by gathering medical records from practitioners like Qi Yunmeng (戚云门), Wang Zhongyue (王钟岳), Gong Yifan (贡一帆), Sun Yuqian (孙御千), Qi Jinquan (戚金泉), Ye Depei (叶德培), Jiang Xueshan (姜学山), Jiang Hengzhai (姜恒斋), Jiang Yuzhan (姜宇瞻), etc. It recorded nine medical schools' medical experience and 155 medical cases. It provided evidence and recordings for the establishment of the Longsha medical school, and revealed that Longsha medicine enjoyed great reputation in the Qing dynasty in Wuzhong (吴中 the area around Wuxian county, Jiangsu province) area. Longsha medical practitioners excelled at *Wu Yun Liu Qi* theory like Solar Terms (节气2 the 4 seasonal divisions in the Chinese lunar calendar, marking changes in climate, nature, and agricultural activities) and *Kai He Shu* to analyze pathogenesis, predict disease progression, and treat diseases preventively. They were skilled in using decoctions such as *Sheng Ming Tang* (升明汤 Rising and Brightening Decoction) and *Jing Shun Tang* (静顺汤 Calming and Balancing Decoction) recorded in Chen Wuze's (陈无择) *San Yin Ji Yi Bing Zheng Fang Lun* (《三因极一病证方论》 *Treatise on Diseases, Patterns, and Formulas Related to the Unification of the Three Etiologies*). Besides, they were also well-known for the clinical use of classical formulas including *Sheng Qi Wan* (肾气丸 Kidney-qi Pill), *Zheng Wu Tang* (真武汤 True Warrior Decoction), *Xuan Fu Dai Zhe Tang* (旋覆代赭汤 Inula and Hematite Decoction), *Wu Mei Wan* (乌梅丸 Mume Pill), etc.

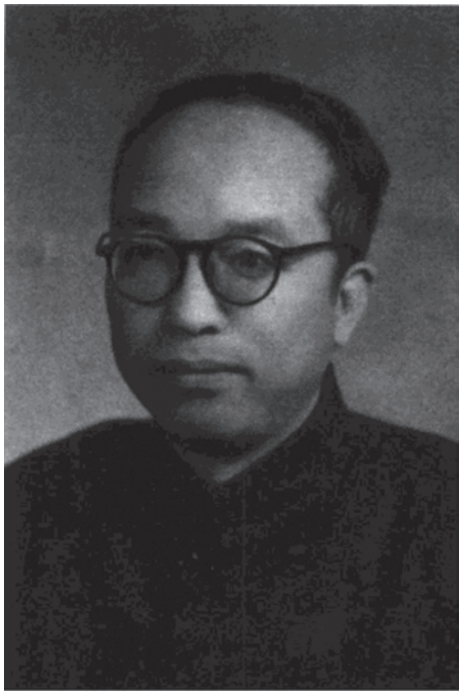


Figure 3 Photograph of Cheng Dan'an [source with permission from: *Cheng Dan'an* (《承淡安》)[6]]

From the mid-to-late Qing dynasty to the Republic of China, a large number of TCM doctors emerged in Longsha area including Gao Bingjun (高秉钧), Wang Xugao (王旭高), Liu Baoyi (柳宝诒), Zhang Yuqing (张聿青), Zou Yunxiang (邹云翔), Cheng Dan'an, etc. Gao Bingjun was the creator of Xinde school (心得派 one of the three major schools of TCM surgery), and developed several famous TCM decoctions such as *Bi Xie Sheng Shi Tang* (萆薢胜湿汤 Hypoglaucae Root Dampness-drying Decoction) and *Niu Bang Jie Ji Tang* (牛蒡解肌汤 Burdock Achene Muscle-resolving Decoction). Wang Xugao initially created "thirty methods for treating liver diseases (治肝三十法)" and summarized systematic diagnostic and therapeutic approaches for liver diseases, which laid a solid foundation for the development of modern and contemporary TCM hepatology. Liu Baoyi

founded *Zhi He Tang* (致和堂), which was as renowned as *Tong Ren Tang* (同仁堂) and *Hu Qing Yu Tang* (胡庆余堂), and refined the craftsmanship of cream-based tonifying TCM medicine (膏滋药). Zhang Yuqing, acting as his father's representative in treating patients suffering from cholera, was renowned for his clinical practice in Dangkou town, Wuxi city where a cholera pandemic broke out in 1864.[7] Zou Yunxiang cured hundreds of patients in his hometown during the prevalent summer pestilence in 1929.[8] Cheng Dan'an was a pioneer in the revitalization of modern acupuncture and moxibustion. In 1930, he founded the Chinese Acupuncture and Moxibustion Research Society (中国针灸学研究社) in Wuxi, which was the first institution dedicated to acupuncture and moxibustion education in modern China. The establishment of the society marked the transformation of acupuncture and moxibustion education from the traditional master-apprentice system to modern school-based education. He also founded the first professional journal focusing on acupuncture and moxibustion in China, *Zhen Jiu Za Zhi* (《针灸杂志》*Journal of Acupuncture and Moxibustion*).[9] To date, Longsha medicine has had a history of over 800 years.

2.2 Formation and transmission of core theories: Longsha medicine's *Wu Yun Liu Qi* theory, *Jing Fang* system and medical family's inheritance

Longsha medicine has a long history for its theoretical system which is rooted in two classical theories: the *Wu Yun Liu Qi* theory from *Huang Di Nei Jing* and the *Jing Fang* system from *Shang Han Lun*. Physicians throughout history have continuously interpreted, applied, and innovated upon these foundations, ultimately forming a distinctive and dynamic diagnostic and therapeutic framework.

2.2.1 Inheritance and development of Wu Yun Liu Qi theory

The *Wu Yun Liu Qi* theory was highly valued and applied by Longsha practitioners. In the Song dynasty, Xu Shuwei, in his works like *Shang Han Jiu Shi Lun* and *Shang Han Bai Zheng Ge* (《伤寒百证歌》*Ode of the Hundred Patterns of Cold Damage*), documented terms such as *Kai He Shu*, *Si Tian Zai Quan* (司天在泉 celestial and terrestrial regulation, or the regulations of six qi in heaven and earth every year), and *Tai Yi Tian Fu* (太乙天符 heavenly complements or a state of harmony in the distribution of six qi across the four seasons), and recorded clinical cases guided by qi movement theory. In the Qing dynasty, Miu Wen annotated *San Yin Si Tian Fang* (Fig. 4) originating from relevant chapters of Chen Wuze's *San Yin Ji Yi Bing Zheng Fang Lun*. This provided a crucial theoretical base for the Longsha diagnostic and treatment system.

Wang Xugao, based on his own clinical practice, wrote *Yun Qi Zheng Zhi Ge Jue* (《运气证治歌诀》*Poems on Pattern Differentiation and Treatment Based on Wu Yun Liu Qi*). In this book, he compared and modified numerous prescriptions from his professional sight. It included 12 poems related to *Wu Yun Liu Qi* theory, such as *Si Tian Yun Qi Ge* (《司天运气歌》*Poems of Qi Movement in the First Half Year*) and *Si Tian Zai Quan Liu Yin Zhi Li* (《司天在泉六淫治例》*Examples of Diseases Treatments caused by Six Disease Qi in a Year*). He also proposed a famous standpoint that "to treat in guide of the *Wu Yun Liu Qi* theory will miss some subtle aspects, to treat without the theory will lose some obvious aspects (执司天以求治，而其失在隘。舍司天以求治，而其失在浮)".

2.2.2 Inheritance of Shang Han Lun and application of classical formulas

Regarding the inheritance of *Shang Han Lun*, Longsha medicine also produced valuable scholarly works, such as *Shang Han Bian Zheng* (《伤寒辨证》*Pattern Differentiation on Cold Damage*) by Lyu Dashao (吕大韶) in the Ming dynasty, *Shang Han Mi Ji Xu Ji* (《伤寒秘笈续集》*Secret Compendium of Cold Damage: Sequel*) by Qian Weiyong (钱维镛) in the Qing dynasty, and *Shang Han Lun Lei Shu* (《伤寒论类疏》*Systematic Annotations on Shang Han Lun*) by Zhang Xiaopei (张孝培). Wang Hu (汪琥), a physician from the Wu medical school (吴医) in the Qing dynasty, commented that Zhang Xiaopei's annotations "expressed his own unique opinions without slavishly following the common views of others (能独出己见，而不蹈袭诸家之说)". Although many of these related medical books were lost or unpublished, the fact attests to the continuous development and inheritance of Shang Han scholarship by Longsha medicine.

2.2.3 Medical families, school inheritance and contemporary innovation of Longsha medicine

Literature research in recent years reveals that many time-honored Longsha medical families appeared in the course of its development. However, with the development of the times, many medical families gradually abandoned the relatively insular inheritance model, breaking the patriarchal clan limits to accept relatives and even followers to pass on their medical knowledge.

The most representative one is the Zhu family in Fengge hamlet (凤戈庄), Qiaoqi village (峭岐镇), Jiangyin county. Family Zhu passed down its unique medical knowledge to the eighth-generation descendant Zhu Hongjiu (朱鸿九), and then the ninth Zhu Shaohong (朱少鸿) and Zhu Shennong (朱莘农). Then, Zhu Shennong passed it on to his son Zhu Fengjia (朱凤嘉). The ninth generation earned the honor of *Yi Men San Jie* (一门三杰 three outstanding doctors in one family) for they all excelled at curing severe exogenous diseases. From the ninth generation, the Zhu family started to

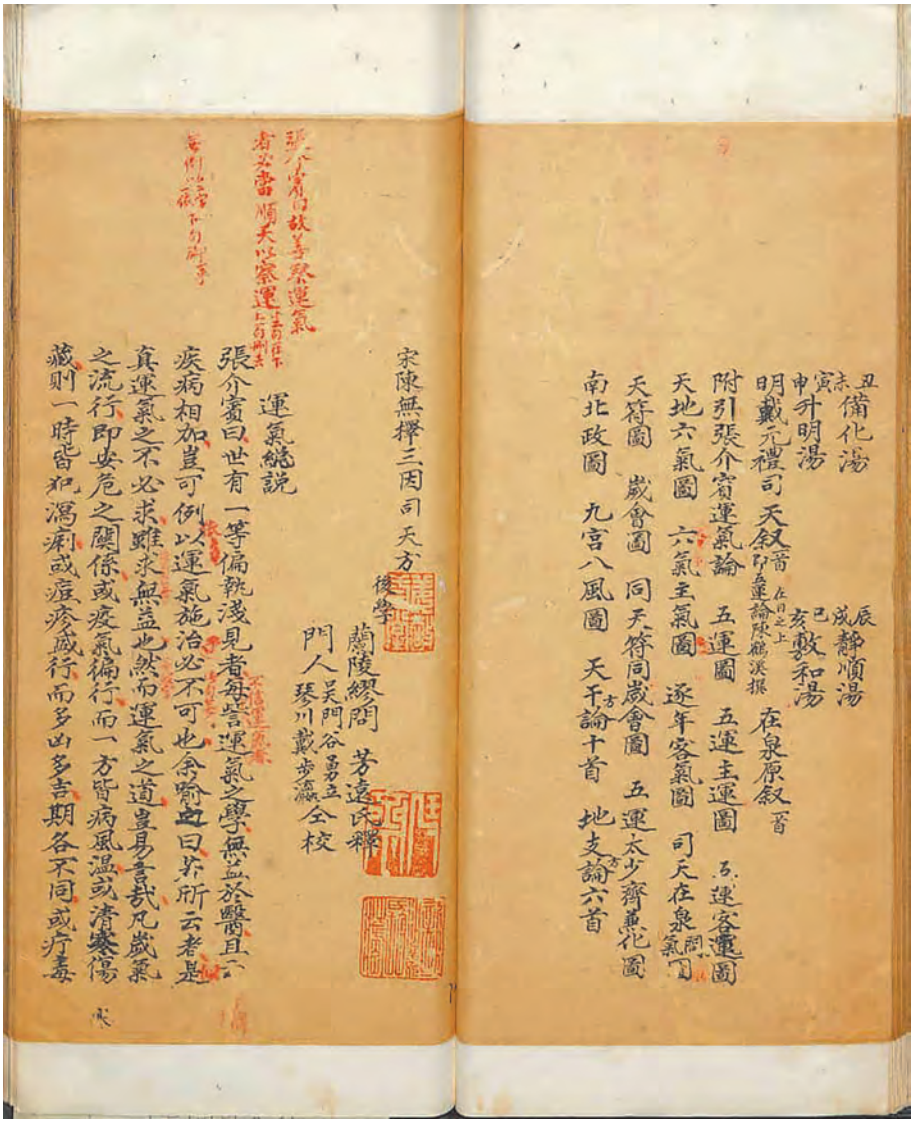


Figure 4 Chen Wuze's *San Yin Si Tian Fang* annotated by Miu Wen, second year of Jiaqing, Qing dynasty (source with permission from: picture made by the authors)

abandon the clan-based restriction. Zhu Shaohong and Zhu Shennong recruited a large number of students. They passed on the Zhu family's medical knowledge to Gu Lyuzhuang (顾履庄), Xu Lyuhe (许履和), Xing Lijiang (邢鹂江), Xia Yijun (夏奕钧), Cao Yongkang (曹永康), Xie Qishun (谢启舜), etc. Thus, Family Zhu developed into the Zhu school of medicine, specializing in exogenous diseases and cultivated abundant medical talents.

Longsha medicine has formed a unique application system of classic formulas as a result of being passed down by generations of practitioners and the influence of famous physicians like Xu Shuwei. Longsha medicine holds its unique clinical features, such as paying attention to the correspondence between formulas and patterns, focusing on the correspondence between formulas and medicines, attaching importance to the body constitutions, patterns and diagnosis, using acupuncture and classic formulas instead of medicines alone, being good at the *Yun Qi* (运气 qi movement) theory, applying classics under the guidance of the *Liu Jing Yu Jie Shi* (六经欲解时 a theory about the recovering times of Six Channel diseases) theory and *San Yin San Yang Kai He Shu* theory.

2.3 Social, economic and cultural driving forces: historical background of Longsha medicine

Since the Song dynasty, the southward migration of China's political center has driven the Jiangnan region to gradually develop into the national hub of economy and culture. Thus, the medical center moved southward. This provided the macro-historical conditions for the birth of Longsha medicine and other regional medical schools. The fact that Longsha medicine took shape and flourished during the Ming and Qing dynasties was no accident. Instead, it was the result of the combined influence of the unique economic foundation, cultural atmosphere and social structure of the Jiangnan region at that time.

Economically, from the Song and Yuan dynasties to the Ming and Qing dynasties, the Taihu area, with its dense water network, fertile farmland, and prosperous grain transportation and commerce, became a renowned prosperous region encapsulated in the saying "When Jiangsu and Zhejiang are well-harvested, the whole country is sufficient (江浙熟，天下足)". The solid material base directly supported medicine and its related activities. On the one hand, it enabled the compilation, engraving and dissemination of medical books, facilitating the accumulation of medical knowledge. On the other hand, material affluence gave rise to the culture of herbal paste prescriptions that emphasized tonifying and regulating (补益调理), while the region's abundant medicinal resources also prompted physicians to conduct in-depth research into the processing of authentic medicinal materials and their clinical application. Therefore, economic prosperity not only provided material support for Longsha medicine, but also directly shaped its clinical orientation and characteristics of dosage forms.

Culturally, the Song government's policies of respecting Confucianism and valuing medicine, and its support for medical institutions and the printing of medical books facilitated the systematization and dissemination of medical knowledge. Official institutes such as *Tai Yi Ju* (太医局 Imperial Medical Bureau) and *Jiao Zheng Yi Shu Ju* (校正医书局 Bureau for Revising Medical Books) provided academic platforms for TCM physicians. Jiangnan, renowned as a "land of literature and archives (文献之邦)", fostered a long-standing tradition of revering culture and education. The imperial examination system and the flourishing academy culture produced large numbers of "Confucian doctors (儒医)". Under the ideal of "if not a good prime minister, then a good physician (不为良相，则为良医)", plenty of scholars devoted themselves to TCM. They integrated Confucian moral cultivation with medical classics, and attached great importance to interpreting medical texts and explaining medical theories. As a result, Longsha medicine had a high degree of consciousness in theoretical construction and academic inheritance.

Socially, the Taihu region's dense river network brought both prosperity and disasters. Floods, droughts, the frequent spread of waterborne diseases and epidemics, and population concentration resulting from large-scale southward migration posed major public health challenges such as infectious diseases, sores, warm diseases and pediatric epidemics. These social realities directly drove the Longsha practitioners to conduct targeted clinical explorations. To respond, they deepened their research into "seasonal qi (时气 disease qi in different seasons)", epidemic pestilence (瘟疫) and related pathomechanisms on the basis of *Wu Yun Liu Qi* and warm disease theory. They also developed specialized experience in surgery, smallpox and exogenous febrile diseases, which promoted the flourishing of related Longsha medicine branches. Changes in social demands and disease spectrums thus became important external drivers for the specialized development of Longsha medicine.

In addition, the continuation of medical families and the imperial physician system provided relatively stable institutional mechanisms for medical inheritance. Many Longsha families maintained multi-generational clinical practice and textual traditions through family teaching and master-apprentice transmission, leading to a cumulative refinement of diagnostic and therapeutic skills. It was precisely under the combined historical conditions of economic prosperity, cultural flourishing, pressing social demands and a relatively stable inheritance mechanism that Longsha medicine gradually took shape during the Ming and Qing dynasties and reached its heyday from the late Qing dynasty to the Republic of China era. These factors were intertwined with each other, collectively accounting for why Longsha medicine could be nurtured, developed and endowed with its distinctive academic characteristics against the specific historical and geographical backdrop.

3 Regional characteristics and effecting factors of Longsha region

3.1 Climate and aquatic environment: humid-heat constitution and therapeutic responses

3.1.1 Water-rich geographic location and humid environment

Geographic medicines are specific examples of the environmental factors of *San Yin Zhi Yi* (三因制宜 treatment based on three factors of time, locality, and individual condition in disease treatment). Longsha medicine has its own apparent geographic advantages for its location at Huashi town, Jiangyin county, influencing the surrounding areas in southern Jiangsu province. Jiangyin county has a long history. In 281, the second year of Taikang (太康) of the Western Jin dynasty, it was Ji Yang county (暨阳县), adjacent to Ling commandery (陵郡). In 555, the first year of Shaotai (绍泰) of the Southern Liang dynasty, Ji Yang county was upgraded to Jiangyin commandery for its location at the south part of the Yangtze River. In the 27th year of the Yuan dynasty, the Jiangyin commandery was demoted to a county.

Besides, water transportation has been robust in the county since ancient times. As a transport pivot, the Wuxi-Chengjiang Canal, connecting northward to the Yangtze River through Huangtian (黄田港) port, provides the necessary conditions for linking the southern region with Zhejiang province and the northern part of Huaiyang area (Fig. 5).

Longsha region is mainly composed of flat lands and scattered low mountains and hills. The dry airflow in winter and the moist, warm airflow in summer can move through without hindrance. The subtropical monsoon climate provides abundant sunlight and rainfall. Consequently, the plum rain season uniquely occurs in this region.



Figure 5 Canal chart in *Xin Shui Jin Jian* (《行水金鉴》*Golden Mirror of Water Control*) by Fu Zehong (傅泽洪) and Zheng Yuanqing (郑元庆) in the Qing dynasty, regions south of the Yangtze River, Wuxi city in Jiangsu province nowadays (source with permission from: Nanjing University of Chinese Medicine Library)

Therefore, sufficient rainwater and abundant water resources provide a favorable environment for the development of civilization, though floods occur frequently.[10]

3.1.2 Humid-heat constitution and preference for gentle formulas

It is said that "people's dispositions are shaped by their environment, and their constitutions are the same (一方水土养一方人)". As it is stated in *Su Wen Yi Fa FangYi Lun* (《素问·异法方宜论》*Chapter Different Treatments According to Practical Situation* in *Huangdi's Inner Canon*), "Huang Di asked: 'Why could physicians treat the same disease through different approaches?' Qibo replied: 'It is caused by the differences in geographical environment (黄帝问曰: "医之治病也，一病而治各不同，皆愈，何也？"岐伯对曰: "地势使然也。")". Zhuang Lyuyan pointed out that the climate in Longsha is humid due to its location in the southeastern part of China. People here are prone to catching a cold or being invaded by wind pathogens, and then develop obstruction of qi movement in the spleen and stomach system. Therefore, he thought the prescription of drastic medicines for people here was not advisable. Huang Tang held the view that people who have resided in the Taihu Lake area for a long time tend to have patterns such as floating yang and visceral cold.[11] Thus, his prescriptions focused more on clearing heat due to dampness and heat pathogens' feature of obstructing qi movement and then resulting in heat diseases. *San Yu Ji Xiao* (《三余纪效》*Records of Efficacy in Spare Time*), a medical book, recorded many of his applications of heat-clearing medicines. *Shi Gao* (石膏 gypsum) fired by maltose can clear heat pathogens and promote the function of spleen and stomach system. This is a unique therapy to invigorate the spleen by using bitter and pungent medicines. Sometimes, this therapy would be applied in company with blood-activating, yin-tonifying and dampness-clearing medicines produced from Wuxi considering the condition that deferment of dampness and heat in the body may lead to blood stagnation, dampness retention and yin depletion. Wang Xugao attached importance to the occurrence and development of diseases affected by specific constitutions shaped by different environments. He wrote in *Wang Xu Gao Lin Zheng Yi An Shu Xie Men* (《王旭高临证医案·暑邪门》*Wang Xugao's Clinical Records: Summer Heat Pathogen*) about this: "People who have resided in the Taihu Lake area for a long time tend to have patterns like yang floating and cold of viscera. They therefore tend to eat warm and tonifying medicine……for the treatment, *Ge Gen Qin Lian Tang* (葛根芩连汤 Pueraria and Coptis Decoction) can be the skeleton of prescription. Considering the constitution differences…… (the effect of the prescription based on the decoction) can be verified (久处南方，阳气泄越，中脏常寒，惯服温补……就锡邑治法，葛根芩连是主方。若合体质而论……试服之以观验否)." [12]

Due to the unique geographic, climate and economic environment of the Taihu Lake area, people here prefer to have a delicate diet based on related record, "luxurious diet is prevalent here (奢侈之风甚盛)".[13] Zhou Xiaonong (周小农) (Fig. 6) documented that people here like to eat *Long Yan* (龙眼 Arillus Longan), *Wu Zao* (乌枣 Preserved Fructus Jujubae), *Shen Xu* (参须 Panax Ginseng), etc. They love to drink thick oral solutions and medical wines on their own initiative ("自服龙眼、乌枣、参须之类""自服膏滋""自服药酒") .[14] These over-nutritious habits resulted in a weak constitution and loose muscles. Thus, Longsha medical practitioners prescribed simpler and milder medicines. Shi Yiren (时逸人), a medical practitioner in the Republican period, revised and updated *Jin Fang Jie Biao Tang* (荆防解表汤 Schizonepeta and Saposhnikovia Sweating Decoction) in accordance with his consideration of the constitutional differences of different people. Shi Yiren reduced its exterior-pattern-relieving function and adapted the formula to patients with exterior cold pattern in warm spring in the Taihu Lake area. Liu Baoyi grasped the patients' constitutions in this region during his long-term medical practices in Longsha. He recorded in his *Wen Re Feng Yuan* (《温热逢源》*Practical Treatments on Warm Diseases*) that "For the treatment of warm and heat diseases……

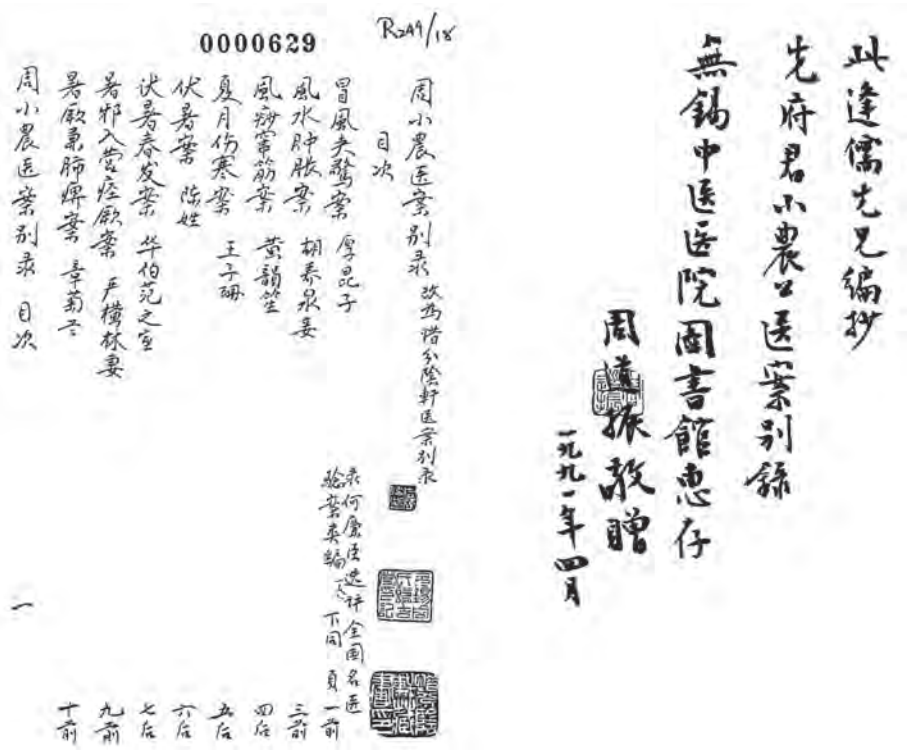


Figure 6 *Zhou Xiao Nong Yi An* (《周小农医案》*Zhou Xiaonong's Medical Records*) compiled and transcribed by Zhou Fengru (周逢儒), Zhou Xiaonong's son (source with permission from: Library of Wuxi Hospital of Traditional Chinese Medicine)

drastic decoctions are suitable for strong constitutions and inadvisable for weak ones (治温热病……惟方药粗悍，宜于藜藿壮实之体，而不宜于膏粱虚弱之人耳)".

However, drastic formulas are not totally contraindicated. Cao Yingfu (曹颖甫) (Fig. 7) pointed out the key problems of mild medicine uses in his *Jing Fang Shi Yan Lu* (《经方实验录》*Applications of Classical Formula*). He said, "Doctors in Longsha and even Suzhou area dare not use drastic medicine like *Gui Zhi* (桂枝 Ramulus Cinnamomi) and *Ma Huang* (麻黄 Herba Ephedrae) due to their opinion that there are no real exogenous cold diseases locally. Drastic medicine can only be prescribed to patients from the northern part of China, because the constitutions of local patients are weak and cannot bear the effect. Doctors in these southern regions like to use *Da Dou Juan* (大豆卷 Semen Sojae Germinatum), *Lian Qiao* (连翘 Fructus Forsythiae), *Sang* (桑 Folium Mori) and *Jyu* (菊 Chrysanthemi) when treating patients with a fever without differentiating cold damage or warm disease. By doing this, how could TCM be prosperous? (苏派医生所以不敢用桂枝，其理由之可得而言者，不外"南方无真伤寒"，仲景之麻桂仅可施于北方人，非江南体质柔弱者所能胜。故若辈一遇热病，无论伤寒温病，一律以大豆卷、连翘、桑、菊应付之。于此而欲中医之不式微，难言之矣)" [15]



Figure 7 Cao Yingfu's former residence in Jiangyin (source with permission from: photo taken by the authors)

Besides, due to the dampness and cold climate in winter in Longsha area, the yang qi of the human body is easily consumed.[16] Therefore, the local people have the folk custom to take thick oral solutions, which has also become a major academic feature of Longsha medicine. Longsha thick oral solution therapy emphasizes formulating prescriptions and using medicines in accordance with the characteristics of qi transformation when the yang qi begins to grow on the Winter Solstice. Therefore, patients are usually told to take the medicine starting from Winter Solstice. By taking the medicine that nourishes the kidney and vital essence when yin reaches its extreme and yang begins to grow, it is beneficial to the function of the kidney to storing essence, strengthening the reserve of original essence in *Ming Men* (命门 gate of life), and thereby enhancing the function of qi transformation, growth and

development in the new round of spring. This is consistent with Longsha medicine's theory of emphasizing qi transformation, and *Wu Yun Liu Qi* theory.

3.2 Medicinal geo-authentic materials in Longsha region

Longsha medicine presents distinctive regional characteristics. Its medicinal choices are closely linked to local geographical products. Water resources are abundant in this region. Thus, the shallow lakes nourish plenty of aquatic and hygrophilous medical plants and resources such as *Bi Qi* (荸荠 Rhizoma Eleocharitis), and *Bai Luo Shi Ke* (白螺蛳壳 Spiral Shell). Research shows that there are almost 970 species of TCM medicinal resources in the area, and 844 of them are plants.[17] Longsha medicine physicians are skilled in using these medicines to resolve phlegm, nourish yin and dissipate masses. Meanwhile, the favorable soil and climate nurture high-quality materia medica like *Mao Cang Zhu* (茅苍术 Rhizoma Atractylodis), *Su Bo He* (苏薄荷 Suzhou Herba Menthae), *Su Qian Shi* (苏芡实 Suzhou Semen Euryales), and they could be used to release the exterior and resolve dampness. In addition, due to the abundance of local products, fresh medicinal materials such as *Xian Ou* (鲜藕 Nodus Nelumbinis Rhizomatis) are readily available. As a result, physicians like Liu Baoyi developed unique experience in favoring and skillfully using fresh medicinal materials.

The medical records of numerous renowned physicians from Longsha reflect their reliance on authentic medicinal materials. Zhang Yuqing once documented his use of *Su Bo He* in treating exogenous diseases, *Lan Hou Sha* (烂喉痧 disease presenting sore, swollen and eroded throat, fever and skin rashes caused by warm-heat poison), and aphonia. Wang Xugao was skilled at using *Xian Ou* to cure hematemesis, warm disease caused by pathogens hidden in the body, protracted fever in the recovery procedure and to regulate the weak constitution as well. Xue Wenyuan (薛文元) preferred to advise female patients after giving birth to drink some black wine made from aged rice produced in Jiangyin county because he believed that the wine, with dense flavor and gentle features, was a superior medicine to tonify blood and activate its circulation. In Huang Tang's (黄堂) (Fig. 8) medical records, one can see the flexible application of local specialties such as *Bai Luo Shi Ke*, *Fang Zhu* and *Bi Qi*. He often used *Bai Luo Shi Ke* to resolve phlegm, dissipate binds, relieve pain, and promote sore healing. Such medication records are quite rare in TCM medical cases compared to those from other regions.

Liu Baoyi paid great importance to the freshness of medicine. In *Liu Bao Yi Yi An* (《柳宝诒医案》*Liu Baoyi's Clinical Practice Records*), *Xian Ou* is the most frequent single-used fresh medicine, due to its high productivity.[19] Liu preferred to prescribe *Xian Ou* and let patients take it as daily drink to cure diarrhea. He thought that *Xian Ou* can modify qi movements, release the water retention in the body, alleviate obstruction of joints and orifices to enhance the effects of routine medicines to expel pathogens and release dampness as well as heat. Besides, *Xian Ou* water can improve the stomach qi movement and produce body fluid for its natural being of tending to prefer the earth (味甘入脾 sweet flavor relating to spleen and the earth in TCM). It can alleviate the bitter and dry flavor as well as the stomach-damaging function of dampness-draining medicines.

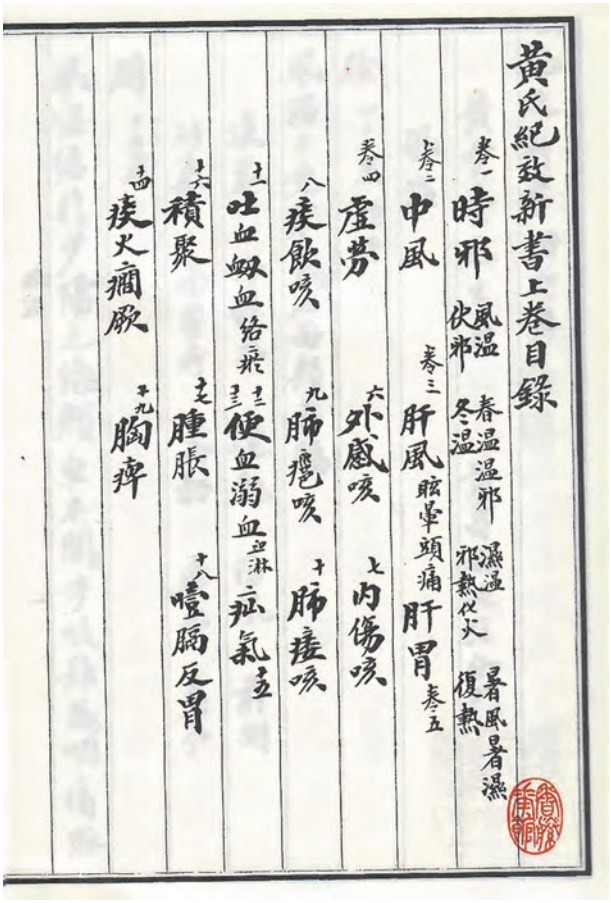

黄氏紀效新書上卷目錄
卷一 時邪 風温 春温 温邪 伏邪 冬温 濕温 邪熱化火 暑風 暑濕 復熱
卷二 中風 卷三 肝風 眩暈頭痛 肝胃 卷五
卷四 虛勞 外感咳 内傷咳
八 痰飲咳 九 肺癆咳 十 肺痿咳
十一 吐血衄血絡損 十二 便血溺血 血淋 疝氣 十三
十六 積聚 十七 腫脹 十八 噎膈反胃
十九 痰火瘰癧 二十 胸痺

Figure 8 *Huang Shi Ji Xiao Xin Shu* (《黄氏纪效新书》*Huang Tang's Clinical Records*), Contents, Volume One, printed in 1981 by Huang Tang (source with permission from: Publishing Hose of Ancient Chinese Medical Books[18])

3.3 Geographical position and cultural interactions: open academic temperament and international transmission

3.3.1 Local cultural hub and formation of Longsha cultural sphere

Longsha medicine developed in an area with profound cultural heritage, the southern region of Jiangsu province. Wang Shuhuai (王树槐), a Chinese scholar in Taiwan, China, described the prosperousness "to sum up, people living in the Taihu Lake area are desire-free. They preferred culture learning, rather than military. They attached great importance to scholarship and manners.

People of all social strata there knew the importance of teaching their descendants to learn, thus there are plentiful achievements in the imperial examinations (大致而言，大江之南，五湖之间，其人轻心而精明，敏于习文，疏于用武，士乐名教，尊礼重安。小民生理咸足，皆知教子孙以读书为事，故江南举业最盛)." [20]

From the Song and Yuan dynasties, the development of Longsha medicine has been in step with changes of historical context. In the Song and Yuan dynasties, the political center shifted to the south gradually. Thus, the cultural, commercial and medical centers also moved southward. In the Ming and Qing dynasties, the southern centers were consolidated, and the development of the regions south of the Yangtze River peaked. In this period, agriculture, handicrafts and business were highly developed and the economy led the whole nation.

The formation and development of Longsha cultural zone cannot exclude the influence of Taihu Lake culture, Wu culture and Yangtze River culture. These cultures together compose the Longsha cultural zone and lay the foundation for Longsha medicine. Surrounded by the Taihu Lake area, the superior location promotes the development of regional economy, cultural prosperity and information exchange as well as talents cultivation. The geographic location forms the core features of Longsha culture: open, creative, learning, excelsior, pragmatic and right-minded.[21]

When it comes to Longsha medicine, a series of cultural and academic features manifested such as paying attention to research and application of classics, putting emphasis on inheriting by running schools and teaching; attaching importance to academic discussion, periodical publication editing and circulation. These features are characterized by containing of creativeness and practicality, commitment to serving the public and TCM reviving, openness and inheriting learning.

3.3.2 Cheng Dan'an and the transformation from local school to global acupuncture

The overseas dissemination of Longsha medicine centered on Cheng Dan'an. He was deeply affected by the regional culture of the Taihu Lake area while possessing a broad global vision. In 1930, Cheng Dan'an founded the China Acupuncture and Moxibustion Research Society (中国针灸学研究社) in Wuxi, pioneering a teaching model combining correspondence courses with face-to-face instruction. With the publication of *Zhong Guo Zhen Jiu Zhi Liao Xue* (《中国针灸治疗学》 *Chinese Acupuncture and Moxibustion Therapy*) in 1931, readers from all regions were drawn to him, prompting him to further establish acupuncture workshops (针灸讲习班), specialized schools (专门学校), acupuncture clinics (针灸门诊) and sanatoriums (疗养院) in Wuxi, launch *Zhen Jiu Za Zhi*, improve acupuncture instruments, print teaching materials and books, thus constructing a relatively complete system of acupuncture teaching and clinical practice.

In 1934, Cheng Dan'an investigated acupuncture and moxibustion education in Japan, and was awarded the Acupuncture and Moxibustion Specialist Diploma (针灸专攻士) by Tokyo Acupuncture and Moxibustion College (东京针灸高等学校). Thus, he became the first Chinese acupuncture and moxibustion scholar to obtain such a qualification by international academic authorities, paving the way for international exchanges of acupuncture and moxibustion in modern times. Not only was he a forerunner in "going global", but he also attracted numerous disciples to study with him for his academic reputation and moral integrity, forming a dense master-apprentice network in Longsha area. These disciples subsequently migrated outward, gradually building a cross-regional pattern of acupuncture and moxibustion dissemination.[22]

In this communication pattern, Hong Kong and Southeast Asia emerged as the first key nodes. In 1935, his student Lu Jueyu (卢觉愚) (Fig. 9) established the Hong Kong Branch of the China Acupuncture and Moxibustion Research Society (中国针灸学研究社香港分社), which became the first acupuncture and moxibustion academic organization in Hong Kong's history. In 1937, Zeng Tianzhi, a top student of Cheng Dan'an, founded the Scientific Acupuncture and Moxibustion Medical College (科学针灸医学院), which was the earliest specialized acupuncture and moxibustion school in Hong Kong, systematically training professional talents in acupuncture and moxibustion. He successfully transferred Cheng's teaching model to Hong Kong, and accumulated educational resources for the subsequent promotion of acupuncture in South China and Southeast Asia. Later, third-generation inheritors represented by Su Tianyou (苏天佑) (Fig. 10) became active in Singapore, Malaysia, the United States, etc., continuing



Figure 9 Photograph of Lu Jueyu [source with permission from: *Yi Lin Han Mo* (《医林翰墨》 *The Vast Collection of Calligraphy and Paintings by Physicians*)[23]]



Figure 10 Photograph of Su Tianyou [source with permission from: *Zhen Jiu Yi An Sou Qi Lu* (《针灸医案搜奇录》 *A Collection of Extraordinary Acupuncture and Moxibustion Case Studies*)[24]]

Cheng's academic style in medical practice and teaching, which embodied Cheng's reputation of "having disciples all over the world (桃李满天下)". Su Tianyou was even hailed as the "Father of Acupuncture in America (美国针灸之父)".

It is worth emphasizing that the subsequent achievements in medical education and practice formed overseas all originated from the modern educational system, textbook framework, and open communication pattern laid by Cheng Dan'an during his time in Wuxi. As a renowned physician, Cheng Dan'an later developed his own distinctive lineage by founding the Chengjiang School of Acupuncture and Moxibustion. From a historical and geographical perspective, Cheng Dan'an's achievements represented the resonance between geographical locations and personal choices. It was precisely Cheng's decision to "take the initiative to go out", coupled with his moral integrity and academic charisma that attracted students from all over the world to enter the field of Longsha medicine and study acupuncture and moxibustion, thereby promoting acupuncture to the world.[22,25] This is also an important geographical and cultural feature of Longsha medicine, and a key fulcrum for its realization of "moving from a regional school to a global one".

3.3.3 Contemporary overseas networks and global health participation

Currently, Longsha medicine has established promotion workstations in Mountain View, Lafayette (California, USA), British Columbia (Canada), Kuala Lumpur (Malaysia), Melbourne (Australia), etc. Representative academic teams and practitioners of Longsha medicine have been repeatedly invited to give lectures at high-end forums in Europe, the United States and Oceania. The number of its overseas inheriting disciples has exceeded one hundred, living and working in the United States, Germany, France, Australia, Canada, Malaysia, Singapore and Switzerland. Through clinical practice, teaching and academic exchanges, they are gradually transforming Longsha medicine from a regional academic school into a participant in global health governance. This process also exemplifies how a TCM regional school can move from "going out" to "local integration", contributing not only to the dissemination of TCM but also to the mutual learning among different civilizations.

4 Conclusion

The formation and evolution of Longsha medicine have profoundly reflected the interweaving and interaction between historical context and geographical environment. Since the Song and Yuan dynasties, the Jiangnan region, by virtue of its increasingly prominent status as an economic and cultural center and its hub advantage of connecting land and water transportation in the Taihu Lake area, has provided fertile soil for the development of medical schools. In this context, Longsha gradually gathered renowned hereditary physicians, forming an academic system centered on classical prescriptions and the theory of *Wu Yun Liu Qi*, with a profusion of medical works and a lineage of medical heritage. Abundant material conditions and a developed transportation network not only promoted the dissemination and preservation of medical knowledge but also drove the maturation of *Gao Fang* and related medical practices with distinctive Jiangnan characteristics. This endowed Longsha medicine with distinct imprints of the times and regions from its very inception.

Geographically, the local hot, humid, and rainy climate coupled with the water network environment not only influenced residents' constitutions but also directly drove the deepening and innovation of academic theories such as *Shang Han* and warm diseases. In the process of addressing local frequently occurring diseases and epidemics, physicians of Longsha medicine thus developed core academic characteristics: emphasizing qi movement, excelling at the application of classical prescriptions, and taking care of individual constitutions. The abundance and utilization of authentic medicinal materials further reinforced their diagnostic and therapeutic practice of "tailoring treatment to local conditions (因地制宜)".

At the level of historical and humanistic context, the tradition of revering literature and education as well as the integration of Confucianism and medicine in Jiangnan region shaped the academic character of Longsha medicine: valuing classics and combining inheritance with innovation. Meanwhile, the open and inclusive cultural mindset, together with a developed land and

water transportation network, laid the foundation for the school to expand from a corner of the Taihu lake area to nationwide and even international dissemination. From Cheng Dan'an's pioneering modern acupuncture and moxibustion education and establishing overseas branches to contemporary physicians' setting of Longsha medicine inheritance bases in multiple countries, the achievements demonstrated its geographical advantages, upholding historical continuity, and continuously participating in global health. To sum up, Longsha medicine is not merely a regional academic school of TCM, but also a crystallization shaped by the combined forces of historical accumulation, geographical conditions, and cultural ecology, vividly demonstrating the academic vitality of TCM.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

GUO Zhen and LU Shu drafted and reviewed this article.

Conflicts of interest

The authors declare no financial or other conflicts of interest.

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Review

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OPEN

A Study of the Cross-cultural Communication of Traditional Chinese Medicine in France

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Abstract

This paper divides the centuries-long communication of traditional Chinese medicine (TCM) in France into three progressive stages: the first stage (17th to 19th centuries), characterized by academic recognition and knowledge transmission; the second stage (mid-19th century to late 20th century), focusing on clinical verification and school-based innovation; and the third stage (late 20th century to the present), marked by cultural integration and pluralistic coexistence within systems. The introduction of TCM in France is a process of cross-cultural adaptation and coexistence driven by specific health needs in French society, such as chronic disease management and complementary therapies. The French medical community and sociocultural context have not only verified and interpreted TCM through an empirical scientific perspective, but also realized creative localization by developing indigenous schools such as electroacupuncture and auricular acupuncture. Eventually, through institutional measures including national certification, terminology standardization, and networked healthcare services, TCM has been deeply integrated into France's medical system and social context, forming a stable ecosystem of cross-cultural adaptation and pluralistic coexistence. The French experience, which takes aligning with local health needs as the starting point, stimulating localized cultural innovation as the core, and promoting systematic integration into local systems as the support, presents a picture of traditional medicine serving modern society, the improvement of global health, as well as mutual learning and symbiosis among different civilizations.

Keywords: Traditional Chinese medicine; Culture; Cultural communication; France

1 Introduction

The value of traditional Chinese medicine (TCM) as a resource for global health is increasingly recognized amid growing public health challenges worldwide and the collective pursuit of a community of health for all. Incorporated into the World Health Organization's global strategy for traditional medicine, TCM, a system grounded in Chinese philosophy and practice that emphasizes holistic balance and preventive care—is notably aligned with contemporary health concepts such as predictive and preventive medicine, as well as the "One Health" approach promoted by countries including France.[1] Its focus on preemptive health management and systemic well-being resonates closely with these forward-looking frameworks, which seek to integrate human, animal, and environmental health through cross-disciplinary cooperation. By contributing to proactive surveillance, risk mitigation, and early intervention, TCM offers a complementary pathway toward equitable, sustainable, and people-centered health coverage. This congruence provides a favorable policy environment and reinforces TCM's potential in modern global health contexts. However, the transnational communication of a medical system involves more than the transfer of knowledge or techniques, as it is fundamentally a process of intercultural communication and adaptation.[2] A key determinant of its trajectory lies not only in its inherent efficacy, but also in its capacity to navigate cultural barriers and achieve acceptance, development, and innovation within the social structures, cognitive paradigms, and institutional frameworks of the host society. Therefore, rather than just proving its worth, investigating the precise routes, pivotal points, and motivating factors of its cross-cultural communication is more practically significant.

France has maintained long-standing cultural exchanges with China as a cultural center of Europe and a key center for Sinology studies. The French naturalist Paul Émile Licent's (桑志华) scientific excursions and museum-building endeavors in China during the early

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20th century exemplified the profound historical roots of this exchange.[3] Digital cooperation in cultural heritage domains like oracle bone script research carries it into the modern world. More importantly, from the standpoint of cultural dimensions, China and France share many similarities on several levels, including long-term orientation and power distance. A comparatively low initial threshold for the adoption of TCM has been made possible by this innate cultural affinity. In parallel, TCM's centuries-long spread in France has progressed from early textual translations to the founding of regional schools (including those for electroacupuncture and auricular acupuncture). In recent years, it has gradually been incorporated into national education, medical collaboration, and regulatory discussions. A complete, distinctly phased communication spectrum has resulted from this. The dynamic process of TCM's cross-cultural transmission can thus be observed in France, making it an incredibly representative case study of how a traditional medical system is selectively adopted, transformed, and ultimately integrated into a foreign sociocultural fabric through a process of mutual adaptation and service.

How, then, has the academic community studied and understood this dynamic process of transmission? A review of the existing literature reveals a remarkably diverse range of perspectives. In tracing the history of transmission, scholars have either provided comprehensive overviews of its developmental trajectory and current state,[4] or focused on pivotal individuals, such as George Soulié de Morant (苏烈)[5] or Paul Ferreroles,[6] or examined the introduction and status of specific fields such as acupuncture.[7,8] At the level of discourse analysis, translation studies, and cross-cultural interaction research, scholars have analyzed media reporting frameworks in France,[9] explored development strategies within local socio-economic contexts,[10] investigated mechanisms through which TCM encounters and adapts to local conventional medical systems,[11] examined translation activities related to classical Chinese medical texts,[12] or even explored how French scholars interpret core philosophical concepts such as qi (气).[13] These studies have clarified fundamental historical facts about the transmission process, key milestones and practical forms, of TCM in France from various angles. They have thus laid an essential foundation for constructing a comprehensive picture of its specific communication dynamics.

However, such descriptive research exhibits certain limitations when attempting to deeply explain the dynamic mechanisms and evolutionary patterns underlying cross-cultural transmission processes. They meticulously document "what happened", but rarely offer systematic analyses of "why it happened this way" or "how it evolved". In particular, the patterned logic behind transmission processes across different historical phases, and their underlying social-cultural drivers remain insufficiently explored. Therefore, it is especially necessary to introduce a theoretical framework capable of integrating long-term historical analysis with multi-level perspectives that can reveal the internal laws governing the symbiotic pathway through which TCM evolved from external introduction to deep integration within French society.

Based on this, this study attempts to introduce the theory of cultural diffusion to provide a coherent analytical framework for this long-term and multi-stage communication phenomenon. This theory examines the transmission, transformation, and adaptation of cultural features over time and across different geographical regions.[14] Contact communication, stimulus communication, and hierarchical communication are among its basic models[15] that offer strong conceptual tools for examining the predominant transmission processes across various historical periods. By employing this paradigm, this study aims to transcend broad historical accounts by addressing the following questions: What significant historical periods did the spread of TCM in France undergo? Which fundamental sociocultural elements and players influenced the development and evolution of its distribution at each stage? What underlying logic and evolutionary tendencies defined its communication pathways?

The study aims to explain the dynamic mechanism of TCM from contact to symbiosis in France. It hopes to clarify how the integration of TCM into France as a common health wealth of mankind can provide a paradigm reference for the cross-border communication of other traditional knowledge systems, and contribute a universal analytical framework and practice blueprint for addressing global health challenges and building a diverse and inclusive global health community through cross-civilization dialogue.

2 The 17th to the 19th centuries: contact communication and academic foundation

2.1 Translation and reception: the Jesuits and scholarly enterprise

The systematic spread of TCM in France began in the 17th century. The human agents with the Jesuits as the core officially opened the first systematic translation and communication to the intellectual circles in France and even Europe. This process continued into the 19th century and constituted a stage of cognitive foundation that lasted for more than two centuries. Its core characteristics are academic acceptance and knowledge introduction. Missionaries (Fig. 1) travelling to China as well as French botanists and sinologists were the principal disseminators throughout this time, and the principal media were the many publications they wrote, translated, or assembled. The audience was limited to France's intellectual elite, who had not yet penetrated the mainstream of medicine, and the content that was primarily



Figure 1 Missionaries in China (source with permission from: On Michel Boym and the Southern Ming Court[16])

distributed concentrated on traditional herbal medicine and pulse diagnosis theory.

As early as 1253, King Louis IX sent the French monk Guillaume de Rubruquis to Mongolia.[17] He recorded Chinese medical procedures that included "diagnosis through pulse examination"[18] and knowledge of herbal medicine in his travel journal, which is the first authenticated French-language description of TCM. This record predates the popular claim that Marco Polo (马可·波罗) introduced TCM to Europe by half a century. However, Rubruquis's report did not become widely circulated in the decades that followed or have an immediate, significant impact on medical knowledge in France or Europe.[19] Its significance lies primarily in its role as an early documented witness to the presence of Chinese medical knowledge in Western travel writings, offering a tangible point of reference for scholars examining the chronology of East-West medical encounters.

Direct and systematic medicinal cultural connections between China and France became relatively rare until the late 16th century, after Rubruquis's intermittent reports in the 13th century. There was no more widespread or ongoing transfer of TCM knowledge to France as a result of changes in the Eurasian political landscape, transportation routes, and sites of exchange. The introduction of Catholic missionaries, especially Jesuits, in the 17th century genuinely ended this period. The new conduit for cultural exchange between the West and China was the missionary movement. They began methodically interpreting Chinese knowledge, drawing on their extensive observations and research in China. Thus, a lengthy journey from dispersed reports to systematic transmission began when Chinese medicinal culture spread to France and entered a new phase focused on textual translation and academic recognition.

Among the missionaries, the Polish Jesuit Michael Boym (卜弥格) (Fig. 2) stood out. His *Flora Sinensis* (《中国植物志》*Flora of China*), published in Latin in Vienna in 1656, was translated into French by Devereux (德尔文) in 1664. This became France's first work introducing Chinese botany (Fig. 3), shaping the French public's initial impressions of TCM.[20] By 1671, Boym's manuscript on Chinese pulse diagnosis was translated into French as *Les Secrets de la Médecine des Chinois, Consistant en la Parfaite Connaissance du Pouls* (《中医秘典》*The Secrets of Chinese Medicine, Consisting in the Perfect Knowledge of the Pulse*). Subsequently, Boym's works on Chinese pulse-taking (Fig. 4, Fig. 5), tongue diagnosis, and herbal formulation were successively published in France.[21] In his *Tractatus de Pulsibus, Quo Declaratur Doctrina Sinarum Philosophiae ex Principiis ac Placitis Philosophiae Ipsorum Medicae, Quae Continetur Codice Vetustissimo Nuy Kim Dicto, Qui Constat Capitibus 162 (Pulsibus)* (《论脉》*on Pulse*), Boym explicitly stated that he aimed to introduce a complete medical system to Europe "based on the principles and perspectives of Chinese physicians themselves". He elaborated on core theories such as yin-yang (阴阳), *Wu Xing* (五行 five elements), and pulse condition (脉象), specifically noting that while these principles differed from European medical concepts, they were "regarded as the standard" in China and had undergone "extensive testing over a long period" (Fig. 6).[22]

These translations demonstrated that missionaries deliberately and proactively introduced TCM to European academia as a scientific knowledge system rooted in Chinese philosophy, characterized by its own logic and a long-standing tradition, rather than merely collecting Eastern oddities. This methodical endeavor significantly



Figure 2 Self-portrait of Michael Boym (source with permission from: *Boym Collection: Sino-Western Cultural Exchange and Transmission of Traditional Chinese Medicine to the West*[22])

contributed to its early popularity within French intellectual circles.

Additionally, in 1723, Jesuit missionary Dominique Parrenin (巴多明) provided a relatively detailed description of the properties and methods of administration for Chinese medicinal herbs such as *San Qi* (三七 Radix et Rhizoma Notoginseng), *Da Huang* (大黄 Radix et Rhizoma Rhei), *Dang Gui* (当归 Radix Angelicae Sinensis), and *E Jiao* (阿胶 Colla Corii Asini) in a letter sent to the French Academy of Sciences (Académie des Sciences). Among these, *Dong Chong Xia Cao* (冬虫夏草 Cordyceps) garnered the most attention within French academic circles, sparking extensive discussion.[23] French naturalists Antoine Jussieu and Bernard Jussieu conducted experimental analyses on the Chinese medicinal materials sent by Parrenin,[24] marking the first documented empirical verification of TCM principles within French academic circles.



Figure 4 Illustrations for the secret methods of pulse diagnosis in China (source with permission from: *Boym Collection: Sino-Western Cultural Exchange and Transmission of Traditional Chinese Medicine to the West*[22])

The culture of TCM gradually spread throughout France, thanks to the efforts of missionaries. It followed a distinct path from scattered, piecemeal knowledge to systematic comprehension and from curiosity to academic study. Jean-Baptiste Du Halde (杜赫德), a renowned French sinologist, compiled accounts on TCM from 27 missionaries who had visited China in 1735,[25] and compiled *Description Géographique*,



Figure 3 A Title page of *Flora Sinensis*; B *Fu Ling* (茯苓 Poria Rubra); C *Sheng Jiang* (生姜 Rhizoma Zingiberis Recens) (right) from *Flora Sinensis* (source with permission from: *Boym Collection: Sino-Western Cultural Exchange and Transmission of Traditional Chinese Medicine to the West*[22])



Figure 5 Boym's figures showing the left and right hands' meridians and acupoints as they appeared in ancient Chinese medical writings (source with permission from: *Boym Collection: Sino-Western Cultural Exchange and Transmission of Traditional Chinese Medicine to the West*[22])



Figure 6 *Tu Zhu Nan Jing Mai Jue* (《图注难经脉诀》*The Illustrated Commentary on the Difficult Classic and Pulse Essentials*), with comprehensive explanatory text and pictorial annotations based on Qin Yueren's (秦越人) *Nan Jing* (《难经》*The Classic of Difficult Issues*) and Wang Shuhe's *Mai Jue* (《脉诀》*Verse on Pulse Diagnosis*) (source with permission from: Kongfz.com[30])

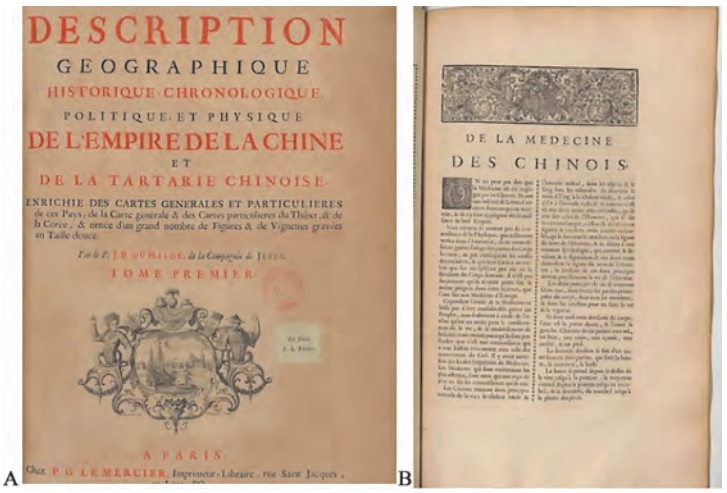


Figure 7 A Title page of *Complete Records of the Chinese Empire*, 1735; B Section on Chinese medicine: de la medecine, des chinois (source with permission from: Special Collection of Literary & Archival Resources: *Description Geographique, Historique, Chronologique, Politique, et Physique de l'Empire de la Chine et de la Tartarie Chinoise*[31])

Historique, Chronologique, Politique, et Physique de l'Empire de la Chine et de la Tartarie Chinoise (《中华帝国全志》 *Complete Records of the Chinese Empire*) (Fig. 7). Beyond translating the catalog and portions of volume one of *Ben Cao Gang Mu* (《本草纲目》 *The Grand Compendium of Materia Medica*), it also documented over ten Chinese medicinal herbs mentioned by Parrenin and their pharmacological properties, marking the first systematic presentation of TCM's knowledge framework. Notably, the book included *Secret du Pouls* (《脉的奥秘》 *The Secret of the Pulse*), accompanied by detailed pulse diagnosis diagrams.[26] Later scholars have traced the Chinese source texts for these diagrams back to Zhang Shixian's (张世贤) *Tu Zhu Mai Jue Bian Zhen* (《图注脉诀辨真》 *Illustrations and Annotations to Systematic Differentiation of Verse on Pulse Diagnosis*) and *Shan Zhu Mai Jue Gui Zheng* (《删注脉诀规正》 *Corrections to the Deleted Annotations to Verse on Pulse Diagnosis*) from the Ming dynasty.[27,28] The pulse classic system, first written by Wang Shuhe (王叔和) during the Wei and Jin periods, was annotated and continued in both works.[29]

In 1740, Jesuit missionary Pierre le Chéron d'Incarville (皮埃尔), commissioned by French botanist Bernard Jussieu, arrived in China to study the characteristics of plants such as *Huang Lian* (黄连 Rhizoma Coptidis) and tea.[32] He compiled a botanical catalog organized by scientific names and sent it back to France along with some seeds. Simultaneously, he transmitted his copies of the Kangxi-era, color-illustrated reprint of the Ming dynasty text *Ben Cao Gang Mu* to France. This work was formally published in 1781 by natural history publisher Pierre Joseph Buc'hoz under the title *Herbier Illustré, ou Collection des Plantes Médicinales de la Chine* (《中华药用植物图谱》 *Herbarium, or Collection of the Medicinal Plants of China*),[33] thereby validating and expanding knowledge from textual records to tangible specimens. Furthermore, building upon the translation of *Les Secrets de la Médecine des Chinois Consistant en la Parfaite Connaissance du Pouls,* Julien-Placide Hervier leveraged the influence of *Description Géographique, Historique, Chronologique, Politique, et Physique de l'Empire de la Chine et de la Tartarie Chinoise* to introduce the core principles of Chinese pulse diagnosis to French society.[27] For an extended period, it served as a primary source for understanding pulse diagnosis in France. By 1767, Professor Fouquet (福克) of the University of Montpellier Medical School published *Le Pouls Chinois* (《中国脉诊》 *The Chinese Pulse*), institutionalizing pulse diagnosis research within academia.[34]

This spread progressively developed into the creation of a French academic community and research paradigms by the mid-1800s. In 1813, sinologist Jean-Pierre Abel Rémusat (雷慕沙) earned his doctorate with a thesis titled *Dissertatio de Glossosemeiotice, sive de Signis Morborum quae e Lingua sumuntur, praesertim apud Sinenses* (《论中国人舌苔诊病》 *Dissertation on Glossosemeiotics, or the Signs of Diseases Taken from the Tongue, Especially among the Chinese*) (Fig. 8), signifying that TCM diagnostic methods had entered the serious academic agenda of higher institutions.[35] In 1847, French botanist Melchior-Honoré Yvan (伊万) meticulously studied *Ben Cao Gang Mu*, building upon the research of his predecessors. He reorganized and systematized its content, ultimately publishing his *Lettre*

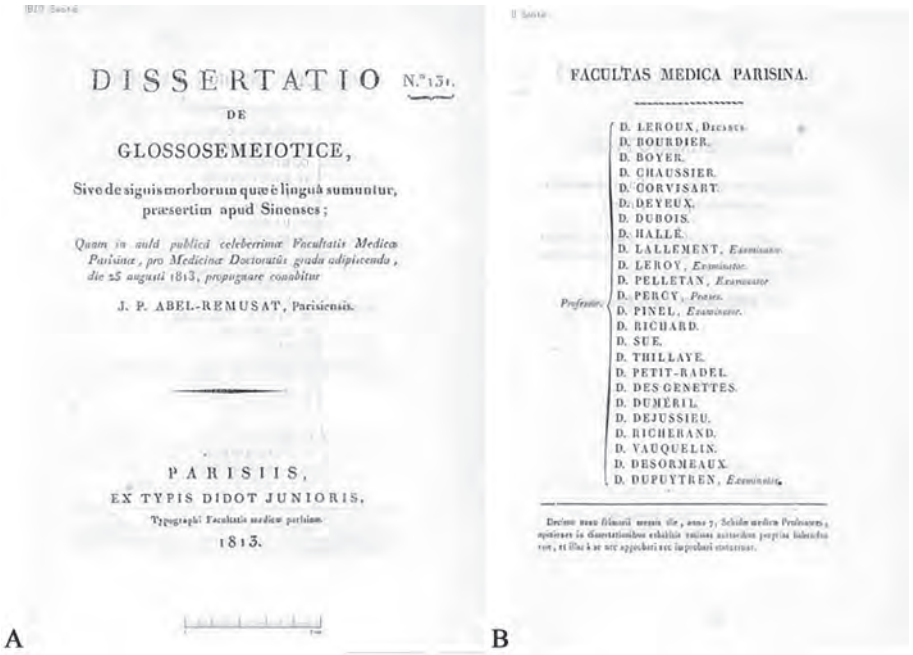

DISSERTATIO N.°131.
DE
GLOSSOSEMEIOTICE,
Sive de signis morborum quæ è linguâ sumuntur, præsertim apud Sinenses;
Quam in aulâ publicâ celeberrimæ Facultatis Medicæ Parisinæ, pro Medicinæ Doctoratûs gradu adipiscendo, die 25 augusti 1813, propugnare conabitur
J. P. ABEL-REMUSAT, Parisiensis.
PARISIIS,
EX TYPIS DIDOT JUNIORIS,
Typographi Facultatis medicæ parisinæ.
1813.
A
FACULTAS MEDICA PARISINA.
D. LEROUX, Decanus.
D. BOURDIER.
D. BOYER.
D. CHAUSSIER.
D. CORVISART.
D. DEYEUX.
D. DUBOIS.
D. HALLÉ.
D. LALLEMENT, Examinator.
D. LEROY, Examinator.
D. PELLETAN, Examinator.
Professores.
D. PERCY, Prases.
D. PINEL, Examinator.
D. RICHARD.
D. SUE.
D. THILLAYE.
D. PETIT-RADEL.
D. DES GENETTES.
D. DUMÉRIL.
D. DEJUSSIEU.
D. RICHERAND.
D. VAUQUELIN.
D. DESORMEAUX.
D. DUPUYTREN, Examinator.
B

Figure 8 A Title page of Dr. Jean-Pierre Abel-Rémusat's doctoral dissertation, 1813; B List of dissertation defense committee members (source with permission from: Rémusat, physician and sinologist[36])

sur la Pharmacie en Chine (《关于中国药学的信》*Letter on the Pharmacy of China*). This work transcended the discussion of individual herbs, delving into the classification of traditional Chinese medicines and their underlying theoretical principles. In 1863, Philibert Dabry de Thiersant abridged and translated Yang Jizhou's (杨继洲) *Zhen Jiu Da Cheng* (《针灸大成》 *The Great Compendium of Acupuncture and Moxibustion*) from the Ming dynasty, followed by publishing an encyclopedic work, *La Médecine chez les Chinois* (《中国医学大全》*Compendium of Chinese Medicine*).[5] Between the start of the 18th century and the 1840s, approximately 50 books on TCM and acupuncture were published in Europe, with France producing the most.[4] As a result, the release and distribution of numerous original and translated publications indicated that the spread of TCM in French academic circles had successfully evolved from an exotic curiosity to a topic of scholarly study. Academic circles began to acknowledge the distributed content as a scientific knowledge system deserving of methodical investigation, as it also progressively became institutionalized and systematized. At this point, TCM had initially completed the identity transformation from exotic spectacles to academic research objects within the French intellectual elites.

2.2 The establishment of scholarly legitimacy

The early spread of TCM culture in France presented a clear and unified communication logic. Specifically, this stage of communication is essentially the first systematic contact and cognition of heterogeneous medical knowledge in the French social structure through specific media and limited networks. Its characteristics can be summarized in the following three levels, and it embodies the contact communication (namely, describing the spread of cultural phenomena through direct geographic proximity, showing a spatial pattern of spreading from the center to the perimeter, from locations close to those farther away) mode in the theory of cultural diffusion.

First, the construction of actors and communication networks during this phase generally presented an elite closed loop centered on missionaries and sinologists. The initiation and promotion of communication relied entirely on a handful of key actors, Jesuit missionaries (e.g., Michael Boym, Dominique Parrenin, etc.) serving as early disseminators, while French-based sinologists (e.g., Jean-Baptiste Du Halde), botanists (e.g., Bernard de Jussieu), and a small number of academic physicians (e.g., Fouquet) formed the core circle for reception, compilation, and research. Knowledge flowed slowly within this closed network of academic elites, from Boym's individual translations to Du Halde's *Description Géographique, Historique, Chronologique, Politique, et Physique de l'Empire de la Chine et de la Tartarie Chinoise*, and further to Abel Rémusat's doctoral dissertation. Its communication depended heavily on direct person-to-person and person-to-text interactions, forming a network that spread from the Eastern World to Western Europe and then radiated outward from academic hubs such as Paris. However, precisely due to the elitist tendency of the actors, TCM remained merely a form of book knowledge and an object of study confined to libraries and academic institutions during this period, failing to enter public view.

Second, the content disseminated during this era was primarily replicative translation and introduction, with its core mission being the direct presentation rather than transformation of TCM culture. Whether Boym emphasized introducing pulse diagnosis according to the principles of Chinese physicians themselves, or Du Halde systematically organized the framework of *Ben Cao Gang Mu*, their efforts aimed to introduce TCM as a self-consistent knowledge system to Europe as completely and accurately as possible. Despite sporadic empirical tests (e.g., Antoine de Jussieu and Bernard de Jussieu's inspections of TCM herbs), the purposes were mostly verification and curiosity rather than the integration of localized transformation and application. This high degree of reproduction of original content is a typical feature of the early stage of contact communication, whose goal is to establish accurate first impressions and cognitive archives, laying the foundation for any subsequent interactions.

Finally, in terms of the sociocultural effects of the communication, the legitimization of TCM's identity was achieved, evolving from an exotic spectacle to an academic topic. The ultimate outcome of this process marked a transformation from the popularization of a medical therapy to the establishment of a cognitive identity. Over two centuries, TCM evolved from vague, distant accounts in Guillaume de Rubruquis' travelogues to systematic treatises and academic arguments by various elites, eventually becoming a serious scientific subject deliberated in French institutions of higher education (e.g., University of Montpellier, Institut de France). This initial recognition within the academic system was crucial for TCM to occupy a legitimate symbolic position on France's cultural map. It accumulated indispensable cultural capital and academic credibility for the next phase of communication—shifting from cognition to practice.

Therefore, the communication during this phase lay in the transmission of cultural traits through direct person-to-person contact, with its influence initially confined to specific groups around the contact points. Knowledge, with texts as tangible carriers, crossed geographical boundaries alongside missionaries' journeys, and was relayed within the small circle of French academic elites through translations, letters, and academic reports. Despite its slow speed and narrow scope, this communication maintained a high degree of content integrity. Precisely this communication model, forged through the efforts of various parties during this phase, enabled TCM's zero-to-one breakthrough in France and

established the initial knowledge repository. However, its elitist and text-based characteristics inevitably called for a deeper communication model driven by practice and innovation in the subsequent phase.

3 The mid-19th to the late 20th centuries: stimulus communication and localized innovation

The spread of TCM in France reached a second peak between the mid-19th century and the end of the 20th century, focusing on clinical practice and technical localization, following the period of knowledge translation. During this stage, TCM transitioned from specimen rooms and bookstores to clinics and labs, shifting from an object of study to a practical tool. France's public demand for alternative medicines, its commitment to scientific evidence, and the innovative dynamism within the medical community were the primary factors driving its proliferation.

3.1 Practice taken root: from clinical validation to indigenous schools

In the 19th century, a few European doctors brought to France data and findings from field tests on TCM. Notably, the French medical establishment became directly interested in acupuncture due to its analgesic and therapeutic properties. Dr. Charbonnier (沙博尼耶) translated the clinical records of British physician James Morss Churchill on acupuncture treatments for sciatica, lumbago, and rheumatism into French and distributed them in 1825.[17,37] Furthermore, the publication of Louis-Victor-Joseph Berlioz's (柏辽兹) *Mémoires sur les Maladies Chroniques, les Évacuations Sanguines et l'Acupuncture* (《关于慢性疾病、出血和针灸的论文》*Memoirs on Chronic Diseases, Bloodletting and Acupuncture*), which highlighted the advantages of acupuncture as a medical treatment, captured the attention of French society.[38] This led to a brief surge, during which 142 French authors published acupuncture-related articles, including Pelletan, Dupuytren, Magendie, and Trousseau, who shared their perspectives in diverse settings, such as laboratories, classrooms, and journals.[39] French interest in TCM shifted from "what it is" to "how to use it" as a result of this change.

By the 20th century, French diplomat George Soulié de Morant (Fig. 9) played a decisive role in further spreading TCM in France. His collaboration with Dr. Paul Ferreyrolles (费雷罗雷斯), a homeopathic physician, was particularly pivotal. After learning acupuncture during his diplomatic service in China, de Morant struggled to share his knowledge in Europe until meeting Ferreyrolles in 1927.[6] Together, they published their first influential paper, "L'Acupuncture en Chine vingt siècles avant J.-C. et la réflexothérapie moderne (《20世纪中国针灸和现代反射疗法》The 20th-century Chinese acupuncture and modern reflexology)" (Fig. 10), which systematically introduced Chinese medical concepts such as yin-yang (阴阳) and holistic theory, described needling and moxibustion techniques, and innovatively framed acupuncture as a form of reflexotherapy to make it more comprehensible to Western medical audiences.[6] They also compared acupuncture points with Weihe points (魏和触痛点) used in homeopathy, further bridging Eastern and Western medical traditions.[40] De Morant not only demonstrated and taught the acupuncture techniques he learned in China to his French medical colleagues (Fig. 11), but also initiated the communication of TCM from France to the entire Western world through his book *Précis de la Vraie Acuponcture Chinoise* (《真正的中国针刺术》*Compendium of True Chinese Acupuncture*) and his personal prestige. His clinical practice began with hospital consultations and culminated in the establishment of his own private clinic in Paris, where he left the earliest photographic records of needle insertion (Fig. 12). This spread underwent adaptation to local cultures, forming distinctive schools of practice.[41] This trend led to acupuncture's gradual development in France by the 1980s, with 9,000 out of 120,000 physicians nationwide capable of performing acupuncture treatments, including 1,000 who specialized in acupuncture-related work.[42] Acupuncture's profound integration into the French healthcare system was further demonstrated in 1996 with the opening of Paris's first hospital specializing in TCM.

Furthermore, the French medical community's proactive attempts to innovatively modify TCM theories and treatment efficacy based on evidence-based science and local demands are the most noteworthy aspect of this phase. Two extensive localized inventions exemplify this.



Figure 9 George Soulie De Morant (1878–1955) (source with permission from: National treasure! Yunnan University of Chinese Medicine acupuncture artifacts tell how TCM "going out"[43])

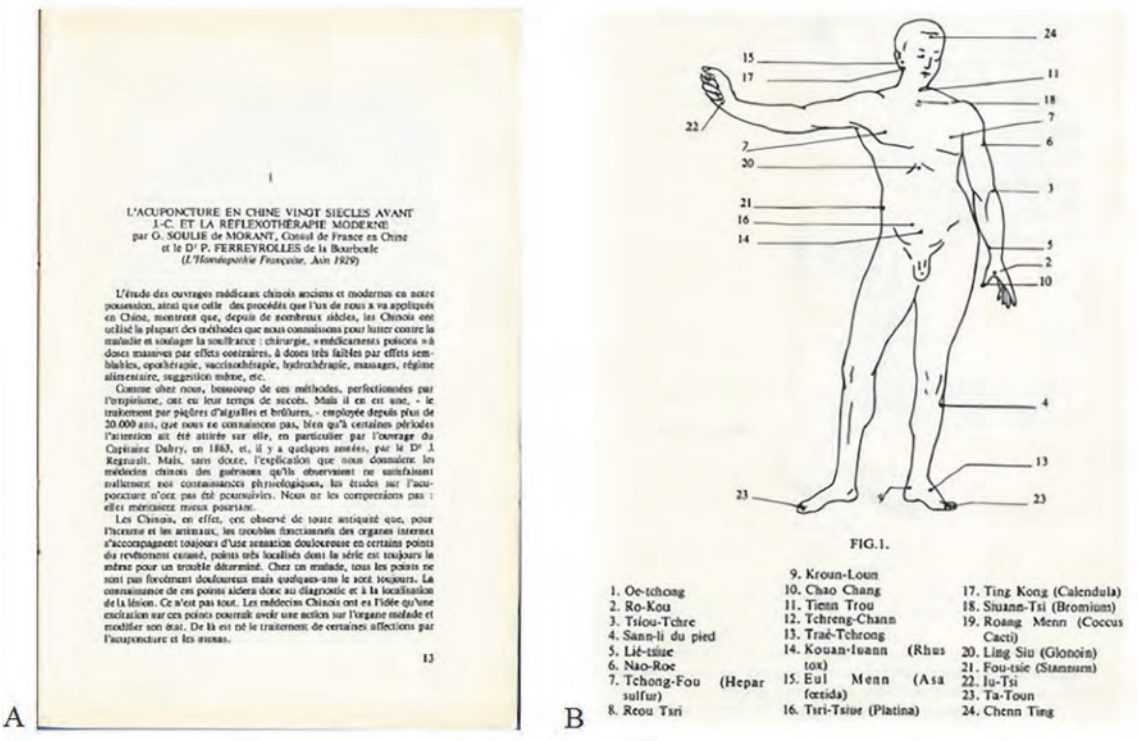


Figure 10 A Page 1 of L'Acupuncture en Chine vingt siècles avant J.-C. et la réflexothérapie moderne; B The human acupoint chart demonstrated by de Morant and Ferreyrolles (source with permission from: Study on the impacts of George Soulié de Morant and Paul Ferreyrolles' first paper "L' Acuponcture en Chine vingt siècles avant J.-C. et la réflexothérapie moderne" on the transmission of acupuncture-moxibustion to the West[40])

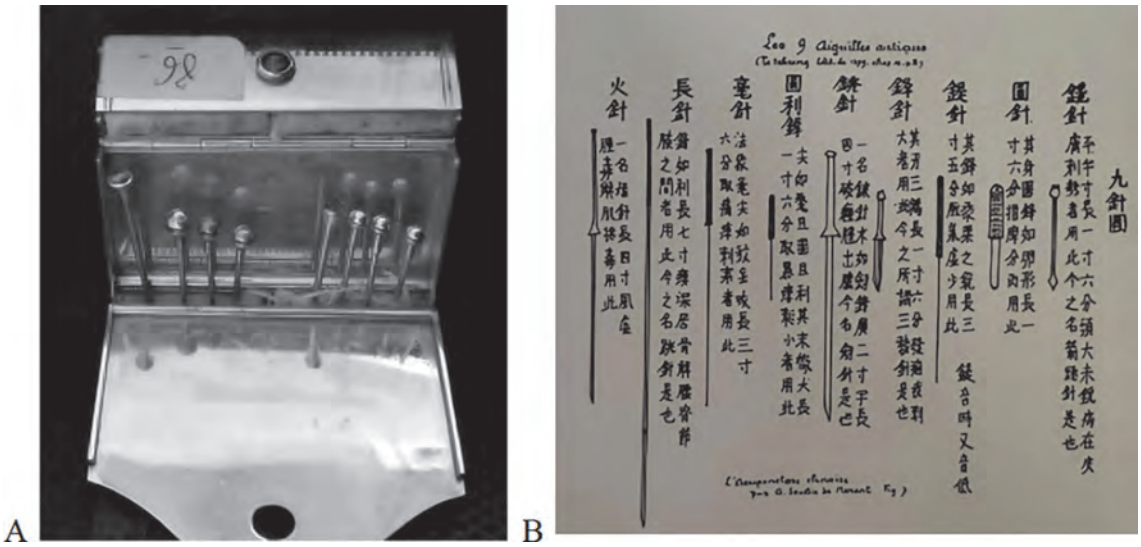


Figure 11 A De Morant's golden needles; B The nine needles diagram of de Morant (source with permission from: *George Soulié de Morant—Father of European Acupuncture and the Western Dissemination of Chinese Medicine*[44])

The formation of French acupuncture schools can be divided into three major branches (Table 1). First came the localized adaptation of traditional acupuncture schools. Following de Morant's efforts to restore acupuncture to its authentic roots, traditional acupuncture gained standardized application and clinical development in France. French acupuncturists preserved core theories and techniques while adapting local elements such as acupoint nomenclature (e.g., adopting the meridians and collaterals numbering system). De Morant, in his treatise *Méthode d'Acupuncture* (《针灸法》*Treatise on the Method of Acupuncture*), superimposed meridians and acupoints onto Western anatomical muscle charts, achieving a formal synthesis of knowledge (Fig. 13). They discovered novel applications for specific acupoints [e.g., using Zhubin (KI9)] for pregnancy preservation, nicknamed the Happy Baby point).[44,45] In short, this school exemplified adaptive refinements and



Figure 12 Photograph of de Morant performing acupuncture on a patient (source with permission from: The formation of French Sinology and acupuncture knowledge from George Soulié de Morant[5])

Table 1 Table of basic data for the three principal schools of French acupuncture

School Name (Active Period)	Representative Figures	Theories and Characteristics
Traditional Acupuncture School (1st half 20th century)	George Soulié de Morant	1. Adapted traditional frameworks to local contexts, e.g., adopting the "meridians and collaterals numbering" system for acupoint nomenclature)
		2. Expanded new applications and efficacy of acupoints
Electroacupuncture School (the 1950s)	Roger de La Fuye	1. Integrated TCM meridian theory with principles of electrical stimulation and homeopathic philosophy
		2. Established a distinctive electroacupuncture therapy
		3. Pioneered evidence-based research in the field
Auricular School (the 1950s)	Paul Nogier	1. Proposed the "auricle as an inverted fetus" mapping theory
		2. Developed auricular therapy for treating conditions such as pain and hypertension

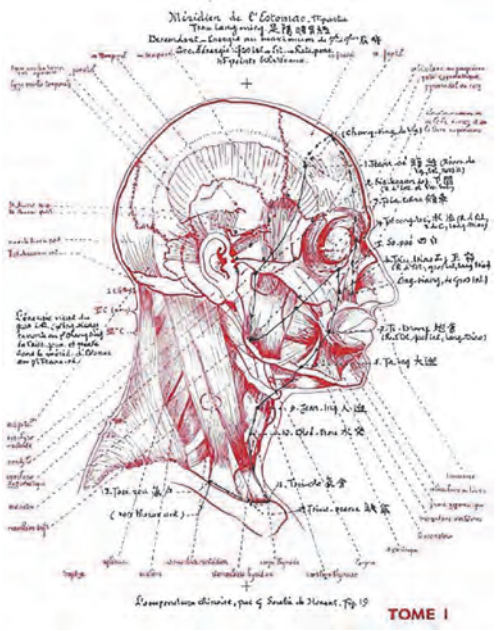


Figure 13 Atlas of the foot-Yangming stomach meridian in *Méthode d'Acupuncture* (source with permission from: The formation of French Sinology and acupuncture knowledge from George Soulié de Morant[5])



Figure 14 Electroacupuncture treatment for breast cancer, 1888 (source with permission from: L'acuponcture électrique[47])

experiential expansion within the traditional framework. Subsequently, the electroacupuncture school emerged. While France had long explored electroacupuncture, it was not until the mid-20th century that Roger de La Fuye (富耶) achieved a true breakthrough. Rather than merely applying electricity to needles, he systematically integrated traditional Chinese meridian theory with the principles of electrical stimulation and even homeopathic philosophy, establishing a uniquely French approach to electroacupuncture. He founded institutions like the French Society of Acupuncture,[44] fostering a scholarly community dedicated to studying the electrical properties of meridians and acupoints using modern physics and physiology (Fig. 14). The emergence of this school represented a hybridization of TCM acupuncture techniques with France's electrotherapy and evidence-based scientific traditions, giving birth to a new therapeutic model. Finally, the emergence of the auricular acupuncture school saw Dr. Paul Nogier (保罗) establishing the auricular therapy, a significant achievement in France's localized innovations. Having observed Chinese practitioners achieving success in treating sciatica by auricular cauterization (烧灼耳廓法), he subsequently discovered positive responses to auricular acupuncture for various pains, hypertension, and neurological disorders. Consequently, in 1956, he published a rigorous research paper on auricular acupuncture,[45] pioneering the mapping theory that "the auricle corresponds to an inverted homunculus (耳廓如倒置胚胎)" (Fig. 15).[46] This marked another innovative advancement in French acupuncture, following the development of the electroacupuncture school. This French-founded school

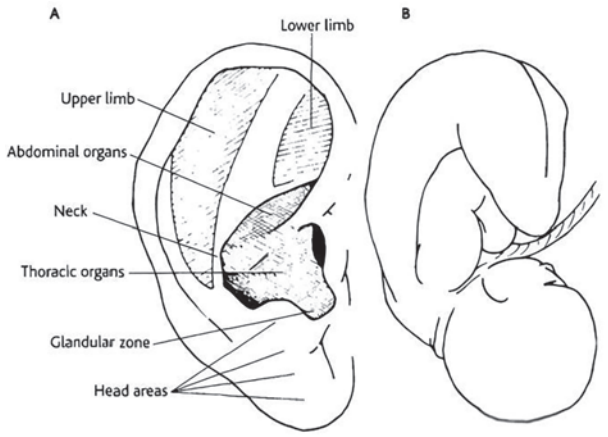


Figure 15 Nogier's original ear charts display somatotopic correspondences to specific auricular regions (A) and the inverted fetal pattern of the external ear (B) (source with permission from: *Auricular Acupuncture Diagnosis*[48])

not only rapidly spread across Europe and America but also fed back to China in the 1950s, stimulating research and development of Chinese micro-needle systems (such as auricular and facial acupuncture), becoming a model of cultural re-nourishment.

Conversely, there was the scientific investigation of meridian study. French researchers Jean Borsarelle and De Vemejoul employed cutting-edge methods, including isotope tracer imaging and infrared thermography, to conduct the first empirical studies on meridians in the 1970s and the 1980s. They discovered that the preferential isotope communication pathways along the fourteen regular meridians corresponded almost precisely to the ancient descriptions of the longitudinal trajectory of the meridians, neither aligning with nerve trunks nor arterial, veins, or lymphatic vessels.[49] In addition to encouraging domestic meridian research in China, this method of translating and confirming Eastern classical notions using Western scientific language also helped to shape Western scientific language. For instance, their research findings provided significant reference and impetus for the launch of China's national "Eighth Five-Year" meridian research project.[4] This interaction had a reverse driving effect and prompted additional domestic research. Additionally, it promoted an international scholarly discussion about the scientific foundations of TCM across cultural boundaries. The foundation for the later development of formalized high-level academic exchange mechanisms between China and France in the field of TCM, such as the Sino-French Medical Exchange Conference, was laid by this early academic exchange, which was facilitated by scientific accomplishments.

By 1986, the French government mandated enhanced research and promotion of natural medicines (including Chinese herbal medicine) and decided to incorporate TCM education into higher medical school curricula.[50] This action established institutional safeguards for the communication of TCM and acknowledge its significance as a complementary medicine at the state level. Acupuncture was progressively incorporated into standard government healthcare services from the 1960s, when certain doctors promoted it for pain management and anesthesia, to its introduction in obstetric institutions in 1988 for labor analgesia. Thus, it is evident that TCM in France has evolved from mere book knowledge into academic practice and medical innovation, with the depth and resilience of its communication significantly enhanced.

3.2 The pattern of creative hybridization

Unlike the contact communication in the first phase, which focused on knowledge introduction, the driving forces, agents, and forms of communication in this phase have undergone fundamental transformations. Its core characteristic lay in the fact that the French medical community has proactively conducted deconstruction, reorganization, and re-creation of TCM (especially acupuncture) based on local clinical needs and scientific paradigms. This process perfectly aligns with the stimulus communication model in the theory of cultural diffusion. When cultural phenomena undergo form-specific changes during transmission to achieve localization while maintaining essential notions, these are known as stimulus communication. This illustrates how cultural components can be adaptively restructured in cross-cultural settings.

First, the main agents of communication have shifted from sinologists and missionaries to clinicians and researchers. Key new actors emerged, such as George Soulie De Morant (diplomat and acupuncture practitioner), Paul Nogier (physician), and Roger de La Fuye (physician). Their identities in the communication network were those of practitioners and innovators, with their field of practice moving from desks to clinics, laboratories, and academic conferences. Their goal was to solve clinical problems, develop new therapies, or verify traditional theories.

Second, the driving force of communication is no longer the cognitive curiosity of actors, but rather their practical needs and scientific validation. The impetus stemmed not from curiosity about exotic cultures, but from French society's demand for addressing practical health issues such as chronic pain management, as well as the medical community's stringent requirement for empirical verification of all therapies through clinical practice and experiments. From the translation of Churchill's clinical records to the widespread discussions sparked by Berlioz's papers, and later to the scientific investigation of meridians using infrared imaging and isotope tracing technology, the central thread has always been "Is it effective? How to prove it in scientific language?" This demand-driven empirical spirit is a prerequisite for the occurrence of stimulus communication.

The most distinctive feature was the emergence of localized innovation—a typical outcome of stimulus communication. Instead of adopting TCM in its entirety, the French medical community, based on the research and verification of its core concepts, integrated local technologies and theories to create new forms, such as electroacupuncture, auriculotherapy, and scientific research on meridians. These innovations retained TCM's core principles (e.g., body surface correspondence, energy channels) but their manifestations and interpretive frameworks were profoundly Francized and even scientized. Particularly noteworthy is the occurrence of reverse cultural flow, as achievements like auriculotherapy flowed back to China, vividly reflecting the two-way cultural interaction brought about by stimulus communication.

Finally, the communication network expanded from academic circles to medical practice and early institutional systems. Acupuncture evolved from discussions among 142 physicians to being used by nearly 10,000 physicians nationwide, and from pilot projects in individual hospitals to government policies supporting research and education. This indicates that innovative achievements began to seek and gain a certain degree of systematic acceptance, laying the foundation for comprehensive institutional integration in the next phase.

Therefore, the communication during this phase is essentially stimulus communication. As active agents, the French medical community conducted selective learning and transformation of foreign cultures and medical practices based on its own cultural schemas and medical cognition, ultimately creating new content with local and cultural characteristics. This marks that the communication of TCM in France has shifted from passive acceptance to an active phase of symbiosis and creation.

4 The late 20th century to the present: hierarchical communication and systemic symbiosis

As TCM therapies such as acupuncture took root in French clinical practice and spawned localized schools, their development gradually reached the limits of what individual innovation and partial practice could encompass. To achieve broader standardized application, social recognition, and resource acquisition, it was imperative to break free from the model relying on personal authority and fragmented cooperation, entering a new phase dominated by state authority, industry standards, and systematic networks. Since the late 20th century, TCM in France has undergone a fundamental shift, with its core driving force transitioning from clinical needs and technological innovation to institutional construction and systemic integration. This section will focus on elaborating how TCM, through a series of institutional arrangements, achieved legalization, networking, and ultimately deep integration into France's social fabric, forming a symbiotic system characterized by two-way shaping.

4.1 Building and expansion: the institutionalization of TCM networks

Since the late 20th century, the communication of TCM in France has exhibited a distinct institutional turn. By the late 20th century, institutionalization was driving a new stage in the spread of TCM in France. Its main feature was a change from communication, which depended on localized innovation and individual initiative, to large-scale, uniform replication supported by systematic regulations and official power. Two interconnected aspects of this approach were the progressive networking of TCM service venues from urban centers to outlying locations and the slow top-down popularization of social interaction groups. The legitimacy framework that France gradually constructed for TCM was the underlying premise that linked and supported communication across these aspects.

In today's era of modernization and globalization, institutionalization serves as the fundamental guarantee for deep cross-cultural integration. By constructing an interlocking regulatory framework, France paved the way for TCM's transformation from folk practice into a nationally recognized systemic resource. Among these efforts, the 2007 government authorization to issue national-level degree certificates in acupuncture and moxibustion marked a landmark milestone.[51] This certification provided practitioners with state endorsement and a nationally recognized professional identity for the first time, fundamentally reshaping the professional image and social standing of TCM. It elevated TCM education from a marginal training to a formal part of the national higher education system. This initiative complemented existing professional credentials—the 1985 Auriculotherapy Diploma and the 2006 Inter-University Diploma—to form a comprehensive career pathway spanning skill certification to academic degrees. Subsequently, the 2008 publication of *Nomenclature Normative Internationale Sino-Française des Expressions et Termes Fondamentaux de la Médecine Chinoise* (《中医基本名词术语中法对照标准》*International Sino-French Standard Nomenclature of Fundamental Chinese Medical Expressions and Terms*) (Fig. 16), endorsed by the Paris Public Hospitals Group (AP-HP),[20] addressed the deepest barriers to cross-cultural understanding. This book served as both a terminological bridge between the two medical systems and a reference guide. It provided an essential semantic basis for integrating TCM into mainstream scientific discourse through explicit reference and debate of TCM theories, diagnostics, and therapies within French medical circles, insurance organizations, and even legal writings.



Figure 16 *Nomenclature Normative Internationale Sino-Française des Expressions et Termes Fondamentaux de la Médecine Chinoise*'s cover (source with permission from: The history and current status of traditional Chinese acupuncture techniques in France[42])

With the establishment of qualification and linguistic criteria, securing complete legal recognition became a consensus within the industry. Relevant organizations have been actively advocating for TCM legislation at the national level since 2017. Current statutes clearly state that only holders of nationally recognized credentials are permitted to engage in professional promotion related to acupuncture, despite the legislative process being ongoing. By regulating market access from the outset, this legislation ensures the steady functioning of the TCM healthcare industry. To create a workable consensus for future comprehensive legislation, it aims to steer industrial competition away from a period of variable quality and chaos toward a standardized, transparent track centered on professional qualifications. Together, these top-down institutional structures create a web of legitimacy. Under the protection and guidance of this network, TCM has spread beyond the French social fabric and beyond elite boundaries. To achieve proper grassroots integration, the propagation chain has shifted from relying on cultural curiosity and individual authority to one based on institutional regulations and social legitimacy.

TCM culture has been introduced throughout all facets of French society, thanks to the establishment of numerous institutional frameworks. It is no longer limited to being an exotic culture that can only be studied by intellectual elites. Therapies such as acupuncture have now been introduced into top hospitals under the Paris Public Hospital Group (AP-HP), including the obstetrics and gynecology department at Pitié-Salpêtrière Hospital, where it is used to alleviate pain during labor and delivery.[4] A Sino-French TCM cooperation center has also been established. By this stage, acupuncture and TCM had evolved beyond being merely cultural curiosities in books or experimental clinical data for doctors. They became routine health services that ordinary French citizens could freely choose in private clinics and even public hospitals. Concurrently, cooperation flourished: intergovernmental collaboration (e.g., the Sino-French TCM Cooperation Committee), hospital partnerships (e.g., Xiamen University Hospital of TCM collaborating with the Huangzhong Institute of TCM in France), educational partnerships (e.g., Nanjing University of Chinese Medicine and the European Academy of TCM in Strasbourg, France, which established a joint postgraduate program in Chinese medicine—currently France's sole institution granting postgraduate degrees in TCM[52]), and civil society interactions (e.g., large-scale conferences hosted in France by the World Federation of Chinese Medicine Societies) collectively form a multidimensional collaborative network. This network continuously channels resources, technical expertise, and legitimacy support.

Furthermore, there are clear hierarchical geographic features in the spatial distribution of TCM healthcare services. Naturally, Paris is the central hub for dispersion because it is the center of France's politics, culture, medicine, and academia. This is where the first TCM hospital was founded, where national TCM degree authorizations originated, where terminology standards were developed, and where the most significant public hospital partnership initiatives were brought to fruition. It then spreads outward to regional centers, such as Lyon, Strasbourg, Toulouse, and Marseille (secondary nodes), along France's urban hierarchy. There secondary nodes establish important clinics, educational institutions, and regional centers. Ultimately, a service network spanning larger areas emerges as results of further communication from these nodes. TCM's continuous growth is made possible by this pattern, which concentrates in the capital before trickling down the urban hierarchy to build a statewide service network.

Thus, the development of TCM in France was marked by its comprehensive integration into industry, culture, and societal recognition. During this period, France saw the emergence of domestic TCM enterprises (e.g., JZ Laboratoire) integrating R&D, production, and education. Their products, compliant with EU standards and gaining market acceptance, signaled TCM's evolution from imported goods to mature commodities capable of localized production and distribution in Europe. Furthermore, classic TCM texts like the French edition of *Huang Di Nei Jing* (《黄帝内经》*The Yellow Emperor's Inner Classic*) and wellness books remain consistently popular in France (Table 2). At the same time, practical guides such as *Médecine Traditionnelle Chinoise-Plantes Médicinales Occidentales* (《中国传统医学-西方药用植物》*Traditional Chinese Medicine-Western Medicinal Plants*) and *Précis d'Acupuncture Chinoise* (《中国针灸学概要》*Concise Treatise on Chinese Acupuncture*) written by French authors have also achieved considerable

Table 2 Top 6 sales of TCM related classics on the Fnac Online Bookstore (from its launch to December 2025)

Books	Sales
Su Wen-Second Partie (《素问》*Basic Questions: Part 2*)	3,126,499
Precis de Medecine Chinoise (《中医精要》*Synopsis of Chinese Medicine*)	603,603
Huang Di Nei Jing Su Wen (《黄帝内经素问》*The Yellow Emperor's Inner Classic: Basic Questions*)	508,026
Nan Jing (《难经》*The Classic of Difficult Issues*)	508,026
Acuponcture et Moxibustuon (《针灸》*Acupuncture and Moxibustion*)	316,237
Bencao Bossa Nova (《本草纲目》*The Grand Compendium of Materia Medica*)	153,017

sales. It collectively indicates that the reception of TCM knowledge in France has transcended mere technical adoption, signaling an ongoing process of cultural internalization and semantic reconstruction. TCM wisdom is being reframed from a specialized medical discourse into a popular health culture and quotidian philosophy, actively consumed and integrated into daily life. This shift marks an advanced phase in its social communication, characterized by the convergence of cognitive assimilation and consumer practice. Approximately thirty private TCM schools and training institutions[39] across France complement the national diploma system, collectively forming a multi-city network for cultivating TCM professionals. This provides the human resource foundation for the industry's sustained development.

4.2 The achievement of systemic symbiosis

A fundamental transformation in the form of TCM's existence in France took place—evolving from a complementary therapy relying on individual expertise and local innovations to an embedded health resource anchored in national and social systemic rules. Its driving forces, pathways, and effects all profoundly reflect the hierarchical communication model in the theory of cultural diffusion. Hierarchical communication refers to the process by which cultural phenomena or objects spread from higher to lower or lower to higher levels within spatially stratified hierarchies, based on different classification criteria.[53]

First, the fundamental driving force and mechanism of its communication lies in institutional construction. A series of initiatives—including national academic degrees, standardized terminology, and discussions on industry legislation—have collectively woven a top-down network of legitimacy for TCM's survival in France. This institutional framework plays a dual role: on the one hand, screening and standardization, which purify the market and establish professional standards through access qualifications; on the other hand, authorization and empowerment, which endow practitioners with legitimate social identities and enable their services to enter mainstream systems such as health insurance discussions and public hospitals. Communication no longer relies on individual authorities but on systemic credibility backed by legitimacy.

Second, the spatial pathway of communication presents a clear network pattern. TCM's layout follows France's existing socio-spatial hierarchy. As the national political, cultural, and academic center, Paris serves as the primary core node where all key institutions originate and top-tier resources converge. Subsequently, technologies and resources diffuse to secondary nodes along the urban hierarchical system (e.g., regional centers like Lyon and Strasbourg), establishing regional education and medical hubs. Ultimately, a nationwide service network is formed. This centralized (axis-based) communication pathway is a classic geographical manifestation of hierarchical communication, ensuring the orderliness and efficiency of communication.

Third, the sociocultural effects achieved by communication have realized systemic symbiosis. TCM is no longer merely one type of traditional medicine existing in France but has begun to deeply integrate with France's social fabric, forming a mutually shaping symbiotic relationship. From being incorporated into the national education system, public hospital service programs, and official cooperation frameworks, to the emergence of local enterprises developing TCM products, and best-selling TCM books written by French authors for the general public—these indicate that TCM has transcended technical introduction and entered the stage of localized reproduction and cultural consumption. TCM is being absorbed by French society and transformed into part of local health cultural strategies.

The information transmission function of early contact communication (e.g., the circulation of new books) persists and operates more efficiently. The creativity of stimulus communication from the second phase has also been integrated into formal channels. Currently, these three communication models have converged into a dynamic symbiotic ecosystem: hierarchical institutions serve as the backbone to ensure legitimacy and stability; continuous contact acts as blood circulation to update knowledge; and stimulus-driven innovation provides metabolic vitality to promote localized growth. This convergent symbiosis marks TCM's historic leap from cultural import to cultural integration in France, evolving into a sustainable social health resource with French characteristics.

5 Conclusion

This study analyzes the communication process of TCM in France, tracing its evolution from initial cultural and textual encounters toward a process characterized by service orientation and systemic coexistence. This process has been driven by the health demands of French society, unfolding through stages of cognitive acquisition, clinical

adaptation, and eventual institutional integration. Such a trajectory highlights the active role of recipient communities in cross-cultural transfer and illustrates a pattern of mutual shaping between an external knowledge system and local socio-cultural structures.

The fundamental motivation for TCM's communication in France is its precise response to and service for the specific health needs of French society. The rooting and development of TCM in France have always centered on its attribute as an effective complementary medical resource. It addresses needs in French society that mainstream medicine has not fully satisfied, such as chronic pain management, postoperative recovery, obstetric and gynecological care, as well as holistic health maintenance. From acupuncture attracting the attention of the medical community in the 19th century due to its analgesic effects, to its application in labor pain relief in public hospitals in the 20th century, these examples demonstrate that the alignment between TCM's practical efficacy and local health needs is the prerequisite for achieving cross-cultural communication.

A prerequisite for achieving in-depth integration is the positivist spirit inherent in French society. The French medical and academic communities were active interpreters and creators. The translation and introduction efforts by early missionaries and sinologists transformed TCM's complex knowledge system into a clear knowledge map. subsequently, French scholars have consistently attempted to understand and verify TCM theories using their own paradigms of anatomy, physiology, and empirical science—such as exploring the essence of meridians through infrared imaging technology. French physicians combined TCM acupuncture principles with local electrotherapy techniques and homeopathic philosophy to develop French electroacupuncture. They also drew inspiration from Chinese folk remedies to independently develop a systematic auriculotherapy, which was later fed back to China. These innovations represented spontaneous empirical explorations of an exogenous medical system driven by French scientific rationality and clinical needs, marking that TCM has been internalized as part of France's own medical research.

The diachronic nature of communication has endowed TCM's spread in France with a long history, but the key to its sustainable development lies in the institutional construction of two-way adaptation. Entering the 21st century, the core of communication shifted from individual innovation to systemic integration. Through top-down institutional designs—such as establishing national acupuncture diplomas, formulating medical terminology standards, and promoting discussions on relevant legislation—France has provided a framework for the standardized development of TCM. Meanwhile, TCM has bottom-up enriched France's medical economy and social culture by entering public hospital service systems, spurring the emergence of local TCM enterprises complying with EU standards, and integrating into the health market. The two-way institutional embedding has transformed TCM from an alternative therapy into an organic component of France's pluralistic healthcare system, forming a stable symbiotic relationship.

From a cross-cultural perspective, the practice of TCM in France has benefited the cross-border communication of traditional medicine and the mutual learning of diverse cultures. In a civilizational context, this process transcends mere technical diffusion, evolving into a successful practice of mutual learning and enrichment between different civilizations. The journey of TCM in France illustrates that in addressing universal health challenges such as population aging and chronic diseases, traditional wisdom from various cultural backgrounds can achieve creative integration and value enhancement through equal, open, and reciprocal dialogue. TCM is no longer confined to the label of "Chinese" medicine. Instead, it is increasingly recognized as a shared treasure of health wisdom that transcends national boundaries.

The history of TCM's communication in France is a narrative of how a heterogeneous knowledge system achieves localized symbiosis in a cross-cultural setting through demand-based screening, innovative adaptation, and cultural integration. Its significance lies in demonstrating a feasible model for intercultural coexistence. It resembles an exchange between different cultures that honors cultural diversity, integrates diverse knowledge systems through dialogue, and enriches health practices via mutual knowledge co-creation. It constitutes the most vivid expression of TCM's role in advancing civilizational mutual learning within the realm of healthcare.

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Author contributions

WU Yulin drafted the paper. XUE Wen reviewed and revised the paper.

Conflicts of interest

The authors declare no financial or other conflicts of interest.

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Review

CHINESE 中医药文化(英文)
MEDICINE AND CULTURE

OPEN

The Historical Origins and Evolution of the Official Name and Efficacy of *Mu Tong* Fruit

LU Tao (卢涛)[1], BAO Wenchu (包文初)[2], SHI Xiaru (石夏如)[2,✉]

Abstract

Mu Tong fruit (木通果实), whose official name in *Zhong Guo Yao Dian* (《中国药典》 *Chinese Pharmacopoeia*) is *Yu Zhi Zi* (预知子 Fructus Akebiae), is a commonly used Chinese materia medica in modern clinical practice. However, its ancient and modern records and descriptions differ significantly. The *Mu Tong* fruit has many alternative names in history. The names commonly used were *Yan Fu Zi* (燕覆子), *Wu Fu Zi* (乌覆子), *Ba Yue Zha* (八月札), etc. Furthermore, there have been many controversies among scholars over the ages regarding the medicinal origin, properties, taste, meridian affinity, and efficacy of the *Mu Tong* fruit. This study aims to clarify the academic origin and correct misconceptions of the nomenclature of *Yu Zhi Zi* through a comprehensive analysis of relevant literature. The *Mu Tong* fruit was primarily used as a food in ancient times, with its "dispersing and regulating" effects first documented in the Tang dynasty. Literature from the Qing dynasty, however, emphasized its "tonifying and replenishing" functions, suggesting a potential bidirectional regulatory capacity. The modern *Zhong Guo Yao Dian* defines its nature as bitter and cold, with efficacy focused on soothing the liver and regulating qi, circulating blood to relieve pain, dispersing nodules, and promoting urination. It is now widely used in cancer treatment. This study aims to integrate historical and contemporary comparative analyses to distinguish the authenticity and validity of medicinal products and examine the complexities of medicine nomenclature. By clarifying origins, it seeks to facilitate the modern application of ancient knowledge and the convergence of traditional Chinese and Western medicine.

Keywords: *Mu Tong* fruit (木通果实); *Yu Zhi Zi* (预知子 Fructus Akebiae); Traditional Chinese medicine; History of medicine; Literature

1 Introduction

In *Zhong Guo Yao Dian* (《中国药典》 *Chinese Pharmacopoeia*, 2025 edition), the official name of *Mu Tong* fruit (木通果实) is *Yu Zhi Zi* (预知子 Fructus Akebiae), which is a kind of dried, nearly mature fruit of *Wu Ye Mu Tong* [五叶木通 Akebia quinata (Thunb.) Decne.], *San Ye Mu Tong* [三叶木通 Akebia trifoliata (Thunb.) Koidz.], or *Bai Mu Tong* [白木通 Akebia trifoliata (Thunb.) Koidz.var australis (Diels) Rehd.], all belonging to the family Lardizabalaceae (Note 1). It is bitter in flavor, and cold in nature. It is effective in soothing the liver and regulating qi, circulating blood, alleviating pain, dissipating nodules, and promoting urination. It enters the liver meridian, gallbladder meridian, stomach meridian, and bladder meridian. Clinically, it is often used for the treatment of distending pain of the stomach and subcostal region, dysmenorrhea, amenorrhea, subcutaneous nodules and masses, dysuria, and other conditions.[1]

The Chinese name *Yu Zhi Zi* of *Mu Tong* fruit has changed throughout history. When *Mu Tong* fruit was called "*Yan Fu Zi* (燕覆子)", *Yu Zhi Zi* as the official name of Trichosanthes cucumeroides seeds (王瓜种子), was first recorded in *Ri Hua Zi Ben Cao* (《日华子本草》 *Ri Hua-zi's Materia Medica*, about 908–923 AD).[2] *Tu Jing Ben Cao* (《图经本草》 *Illustrated Classic of Materia Medica* 1062AD)[3] recorded that *Yu Zhi Zi* was "the seed of a kind of vine, clinging to large trees (作蔓生，依大木上)". Both *Yan Fu Zi* and *Yu Zhi Zi* were climbing plants, and they were easily mistaken. However, the author of *Yin Pian Xin Can* (《饮片新参》 *New Reference of Prepared Medicines* 1936AD) mistook *Yu Zhi Zi* (Trichosanthes cucumeroides seeds) with *Mu Tong* fruit under the same entry due to lack of detailed research, which led to *Yu Zhi Zi* becoming the official name of *Mu Tong* fruit in *Zhong Guo Yao Dian*.

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The change of the official name may lead to confusion about the efficacy of *Mu Tong* fruits and other herbs when medical practitioners read the ancient books. This article will review the nomenclature evolution and efficacy of the *Mu Tong* fruit, aiming to facilitate the advancement of the modernization and internationalization of traditional Chinese medicine (TCM). The term "*Mu Tong* fruit" will be used below to refer to Fructus Akebiae, which has not been named *Yu Zhi Zi* yet.

2 Records of *Mu Tong* fruit in ancient materia medica literature

2.1 Materia medica literature of the Sui, Tang, and the Five Dynasties

Xin Xiu Ben Cao (《新修本草》*Newly Revised Materia Medica*, 659 AD) included a complete record of *Mu Tong* (木通 Caulis Akebiae) in *Ben Cao Jing Ji Zhu* (《本草经集注》*Collective Commentaries on the Classics of Materia Medica*, 492–500 AD), and *Mu Tong* fruit was one of its entries. *Xin Xiu Ben Cao* was the first text to record *Mu Tong* fruit. According to its description, "Its seeds are three or four *cun* (寸) long, with a black core and white pulp, and its pulp tastes sweet. The southerners called it *Yan Fu*, or *Wu Fu* (其子长三、四寸，核黑穰白，食之甘美。南人谓为燕覆，或名乌覆)" (Note 2).[4] From then on, *Mu Tong* fruit has had its two alternative names, *Yan Fu* (燕覆) and *Wu Fu* (乌覆). The book merely documented its sweet taste without mentioning any medicinal effects, indicating that prior to 659 AD, it was primarily consumed as food or fruit rather than used for medicinal purposes.

Shi Liao Ben Cao (《食疗本草》*Materia Medica for Dietary Therapy*, before 739 AD[5–6]) first recorded the efficacy of *Mu Tong* fruit as "regulating intestinal functions, stimulating appetite, unblocking the three jiao, and eliminating bad qi (利肠胃，令人能食，下三焦，除恶气)". It also stated that *Mu Tong* fruit had nutritional values and was able to "replenish the qi of the five viscera and provide sufficient energy (主续五脏音声及气，使人足气力)". The fruit could be taken directly. The book further noted that "Take the branches and leaves, and boil them for drinking (取枝叶煮饮服之)". It remained uncertain whether this note referred to boiling *Mu Tong* leaves with the *Mu Tong* fruit. The author Meng Shen (孟诜) pointed out twice that people living in the north of the Yangtze River were unfamiliar with *Mu Tong* fruits and only knew *Mu Tong*. It could be assumed that *Mu Tong* grew mainly in the southern part of China at that time. Meng Shen gradually started to recognize the medicinal values of *Mu Tong* fruits. Possibly due to the limitation of the low level of its production and trade, Meng remarked: "The northerners only knew the vine of *Mu Tong* (北人只识通草)" (Note 3).

Ben Cao Shi Yi (《本草拾遗》*Supplement to "The Grand Compendium of Materia Medica"*, 739 AD)[7,8] recorded that the *Mu Tong* fruit can "promote bowel movements and urination, disperse and unblock stagnation, and reduce vexation and fever. When consumed, it soothes the heart, relieves thirst, and descends qi (利大小便，宣通，去烦热，食之令人心宽，止渴，下气)". "It is shaped like a bag in which officials place brushes and inkstones. Its flesh is yellow, and the seeds are black (如算袋，穰黄，子黑)". There is also a variety of the *Mu Tong* fruit similar to the description (black core and white pulp) in *Xin Xiu Ben Cao*, which was called *Hou Fu* (猴菑).

In *Ri Hua Zi Ben Cao*, "*Yan Fu Zi* (燕覆子)" was used as the official name of the *Mu Tong* fruit. In this book, the harvesting time was recorded as the seventh and the eighth months in the Chinese lunar calendar.[2] In *Shi Liao Ben Cao*[5] and *Shi Xing Ben Cao* (《食性本草》*Dietary Herbal Medicine*, 937–957 AD),[9] *Yan Fu Zi* was also used as the official name. *Shi Xing Ben Cao* recorded that its property was cold for the first time.

By the early 8th century, the *Mu Tong* fruit's medical values were gradually discovered. During the Sui dynasty, Tang dynasty, and the Five Dynasties, the fruit was considered sweet in flavor and cold in property, which was probably due to its sweet taste and its effects on regulating intestinal functions, circulating qi, reducing fever, and alleviating thirst. At this stage, most *Mu Tong* fruits were eaten directly other than being made into decoctions. This method was taken to retain and utilize the cold nature of the materia medica.

2.2 Materia medica literature of the Song, Jin, and Yuan dynasties

Tu Jing Ben Cao[3] included the *Mu Tong* fruit under the entry for *Mu Tong*, instead of listing it separately. The book did not describe the medicinal effects of the *Mu Tong* fruit, but it provided illustrations of *Mu Tong* and *Mu Tong* fruits (Fig. 1). The stem was up to three *cun* in diameter, with two or three petioles per node. Each petiole bore five leaves. The plant bloomed with purple or white flowers in summer and autumn. The fruit of the tree looked like a small papaya, with a black core and white pulp, and its pulp tastes sweet. There was no new discoveries about the materia medica in other classic herbal texts compiled by government organizations during this period.

In a nutshell, no new advances were made in the understanding of *Mu Tong* fruit during the Song, Jin, and Yuan dynasties.

2.3 Materia medica literature of the Ming and Qing dynasties

In *Jiu Huang Ben Cao* (《救荒本草》*Materia Medica for Famine Relief*, 1403–1424 AD),[10] the immature fruit could also be eaten raw, though it was usually boiled, possibly due to its poor taste. The text referred to this fruit as *Ye Mu Gua* (野木瓜 Caulis et Folium Stauntoniae),

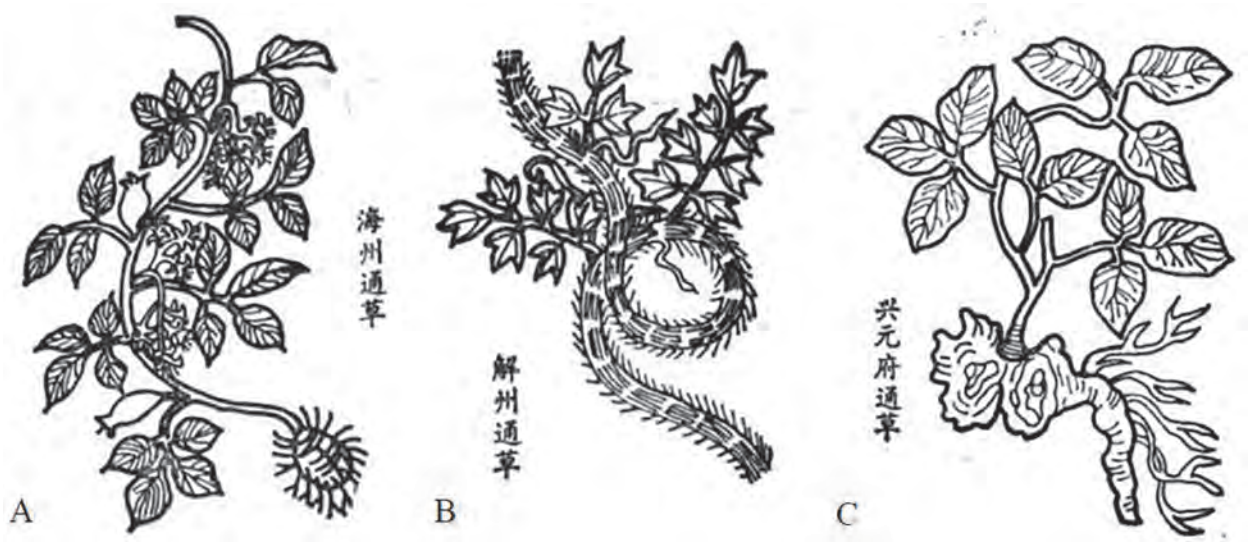


Figure 1 Original illustrations from the Song dynasty *Tu Jing Ben Cao*. A *Hai Zhou Tong Cao* (海州通草). B *Xie Zhou Tong Cao* (解州通草). C *Xing Yuan Fu Tong Cao* (兴元府通草) (source with permission from: Shanghai Library)

also known as *Ba Yue Zha* (八月楂 August hawthorn) (Fig. 2). The name might derive from the fact that *Mu Tong* fruits were harvested in the eighth month of the Chinese lunar calendar. Liu Yong (刘勇) et al. also noted that *Ye Mu Gua* in *Jiu Huang Ben Cao* corresponded to the fruit of *Wu Ye Mu Tong*.[11]

Ben Cao Gang Mu (《本草纲目》*The Grand Compendium of Materia Medica*, 1578 AD)[12] recorded the efficacies of *Mu Tong* fruits in entries from *Ben Cao Jing Ji Zhu*, *Ming Yi Bie Lu* (《名医别录》*Supplementary Records of Famous Physicians*), *Yao Xing Lun* (《药性论》*Treatise on Medicinal Properties*), *Yue Fu Shi Wu Ben Cao* (《乐府诗物本草》*Yuefu Poetic Matters Materia Medica*), *Shi Xing Ben Cao*, *Ri Hua Zi Ben Cao*, *Ben Cao Shi Yi*, *Hai Yao Ben Cao* [《海药本草》*Materia Medica from the (Southern) Seaboard Area*], *Yong Yao Fa Xiang* (《用药法象》*Methods and Patterns of Medicinal Application*), *Hui Min He Ji Ju Fang* (《惠民和剂局方》*Beneficial Formulas from the Taiping Imperial Pharmacy*), *Sheng Hui Fang* (《圣惠方》*Formulas from Benevolent Sages Compiled during the Taiping Era*), etc. The book also recorded seven alternative names of *Mu Tong* fruit: *Yan Fu* (燕覆), *Yan Fu Zi* (燕覆子), *Wu Fu Zi* (乌覆子), *Xu Fu Zi* (畜菐子), *Hou Fu* (猴菐), *Na Zi* (拿子), and *Fu Yan Zi* (桴棪子).

Ben Cao Pin Hui Jing Yao (《本草品汇精要》*Essentials of Materia Medica Distinctions*) (Fig. 3),[13] finalized in 1505 and later supplemented in 1700 by *Ben Cao Gang Mu*, contained information nearly identical to that of *Ben Cao Gang Mu* (《本草纲目》), and stated for the first

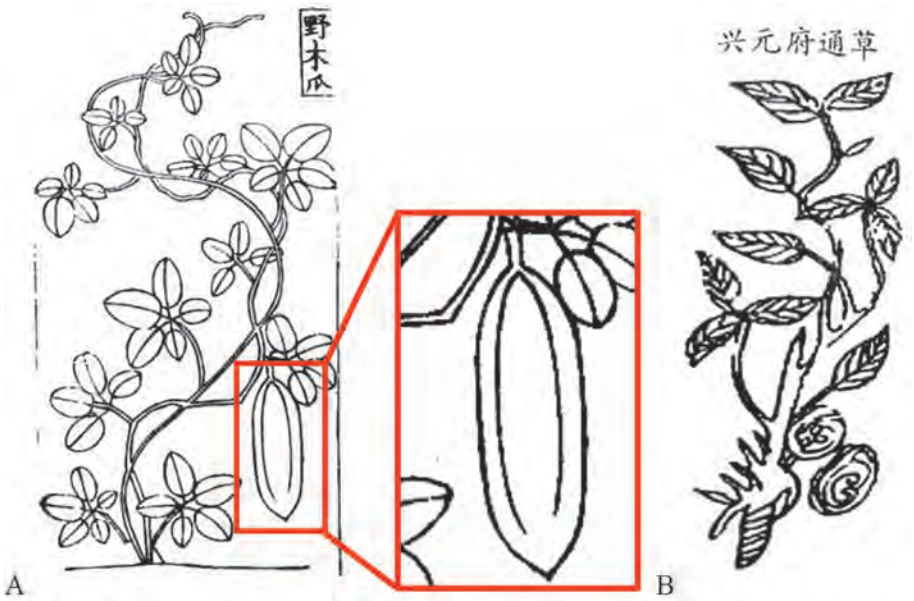


Figure 2 A Original illustration of *Ye Mu Gua* from *Jiu Huang Ben Cao* of the Ming dynasty. A the *Mu Tong* fruit is amplified. B *Ben Cao Meng Quan*, original picture of *Mu Tong*, with a vine as thick as a finger (source with permission from: Shanghai Library)



Figure 3 Original illustration of *Mu Tong* in *Ben Cao Pin Hui Jing Yao* (source with permission from: Shanghai Library)

time that *Mu Tong* and its fruit were forbidden to be taken during pregnancy.

In *Ben Cao Hui Yan* (《本草汇言》 *Treasury of Words on the Materia Medica*, 1624 AD),[14] *Mu Tong Zi* (木通子), another alternative name of *Mu Tong* fruit, was recorded as "taken after boiled in honey (以蜜汁煮食之)". This was the first recorded method of its preparation.

Cao Mu Bian Fang (《草木便方》 *Herbal Formulas*, 1870 AD)[15] was a local herbal work from Sichuan province. It recorded that "The flavor of the root of *Ba Yue Gua* (八月瓜) is pungent and astringent, and it has a warm nature. It can resolve menstrual stasis and heal wounds, strengthen and nourish marrow and essence, strengthen yin, brighten the eyes, and improve hearing. It can also treat gynecological nodules, hernia, as well as swelling and pain in the back and feet (八月瓜根辛涩温，补肾益精能强阴，劳伤疝气兼可治，腰脚肿疼损伤清，瓜甘滋阴明耳目，月瘕劳伤补髓精)". Zhao Suyun (赵素云) et al. collated the data from *Si Chuan Zhong Yi Za Zhi* (《四川中医杂志》 *Sichuan Journal of Traditional Chinese Medicine*), the Sichuan Provincial Census of Traditional Chinese Medicine Resources, and physical specimens, identifying *Ba Yue Gua* as *Mu Tong* fruit. They concluded that its aliases were *Bai Mu Tong* (白木通), *Bai Ri Gua* (百日瓜), and *Tu Ba Ji* (土巴戟).[15]

To sum up, in the early 15th century, *Mu Tong* fruits were primarily consumed as food. At the beginning of the 16th century, medical texts first recorded that it was contraindicated for pregnant women, likely due to its effect of regulating intestinal functions. Literature from the Qing dynasty expanded on its tonic effects, particularly of its ability to strengthen and nourish marrow and essence. This nourishing function is consistent with its long history of culinary use, indicating a recognized nutritional value.

3 Related records of *Mu Tong* fruit in modern literature

Yin Pian Xin Can (《饮片新参》 *New Reference of Prepared Medicines*, 1936)[16] recorded *Ba Yue Zha* (八月札) as the official name of the *Mu Tong* fruit. The alternative name of *Ba Yue Zha* was *Yu Zhi Zi* (预知子). It was the first time that *Yu Zhi Zi* appeared under the entry describing the *Mu Tong* fruit.

The first edition of *Zhong Yao Zhi* (《中药志》 *Journal of Traditional Chinese Medicine*, 1959)[17] first established *Yu Zhi Zi* as the formal name of *Mu Tong* fruit, recording its alternative names such as *Ba Yue Zha* (八月札) in Jiangsu and Zhejiang provinces, *Ba Yue Gua* in Sichuan province, *Yang Kai Kou* (羊开口 Akebia quinata) in Hunan province, *Ba Yue Zha* (八月炸) in Hunan province, and *Yu Zhi Zi* (玉支子) in Hubei province. In this book, *Yu Zhi Zi* referred to the fruit of *San Ye Mu Tong* (三叶木通) (whose alternative names were *Bai Mu Tong*, *Ba Yue Gua Teng* (八月瓜藤), and *Ba Yue Zha* in Hunan and Anhui provinces) and *Mu Tong* (木通) [whose alternative name was *Ye Xiang Jiao* (野香蕉 Musa balbisiana)] in Suzhou province).

Yao Cai Xue (《药材学》 *Herbology*, 1960)[18] established *Ba Yue Zha* as the official name of the *Mu Tong* fruit, whose alternative names were *Ba Yue Zha*, *Mu Tong Shi* (木通实), *Ye Xiang Jiao*, *Yu Zhi Zi*, and *Ye Mu Gua*.

Zhe Jiang Zhong Yao Shou Ce (《浙江中药手册》 *Zhejiang Traditional Chinese Medicine Handbook*, 1960)[19] included *Ba Yue Zha* as the official name for *Mu Tong* fruit, whose alternative names were *Yu Zhi Zi* and *Leng Bao Fan* (冷包饭). In *Quan Guo Zhong Cao Yao Hui Bian* (《全国中草药汇编》 *Complication of China's Medicinal Herbs*, 1975),[20] *Mu Tong* fruit was listed as *Ba Yue Zha* as its official name, with its alternative names *Gou Yao Teng* (狗腰藤), *Ba Yue Gua*, *Ba Yue Zha* (八月扎), *Yu Zhi Zi*, *La Gua* (腊瓜).

Xin Hua Ben Cao Gang Yao (《新华本草纲要》 *Xin Hua Materia Medica Outline*, 1988)[21] included *Mu Tong* as the official name, while *Tong Cao* (通草), *Wu Ye Mu Tong*, *Ba Yue Zha* were its alternative names. *Mu Tong* fruit was listed as *Yu Zhi Zi*, with its alternative names *Ba Yue Zha* (八月札), *Ba Yue Gua*, *Ba Yue Zha* (八月炸), *San Ye Mu Tong* (三叶木通).

Through a review of modern materia medica literature, we find that there has been no universally recognized official name for *Mu Tong* fruit in the academic circles.

In 1953, China promulgated the first edition of *Zhong Guo Yao Dian* without any record of *Mu Tong* or *Mu Tong* fruit. The 1963 edition recorded *Mu Tong* and *Guan Mu Tong* (关木通 Caulis Hocquartiae), but didn't

include the *Mu Tong* fruit. The editions of 1963, 1985, 1990, 1995, and 2000 listed *Yu Zhi Zi*, *Chuan Mu Tong* (川木通 Caulis Clematidis Armandii), and *Guan Mu Tong*, but didn't record *Mu Tong*. The editions from 2005 to 2025 (including 2005, 2010, 2015, 2020, and 2025) listed *Yu Zhi Zi* (*Mu Tong* fruit), *Chuan Mu Tong*, and *Mu Tong*, but omitted *Guan Mu Tong*.

4 Records of *Mu Tong* fruit in Japanese materia medica literature

A number of Japanese texts have contributed to clarifying the origin of *Mu Tong*'s name, some of which discuss the relationship between *Mu Tong* and *Tong Cao*. The plant *Tong Cao* was included in *Yi Ben Tang Yao Xuan* (《一本堂药选》*Yiben Tang Selection of Medicinal Herbs*, 1736).[22] The authors suggested that *Tong Cao* has been called "*Mu Tong*" since Chen Shiliang's book, *Shi Xing Ben Cao*. Therefore, the plant should be properly named *Tong Cao*, as recorded in *Shen Nong Ben Cao Jing* (《神农本草经》*Shennong's Classic of Materia Medica*). In volume 3 of *Gu Fang Yao Pin Kao* (《古方药品考·卷三》*Study of Ancient Prescriptions and Medicinals*, 1842),[23] according to Naito Naokata (内藤尚贤), there was a record of the herb *Tong Cao* (アケビカゾラ). The book mentioned that "*Tong Cao* is the ancient name for *Mu Tong*". *Mu Tong* was included in Otsuka Keisetsu's (大塚敬节) *Han Fang Da Yi Dian* (《汉方大医典》*The Great Medical Dictionary of Chinese Medicine*, 1957).[24] It mentioned the relationship between *Mu Tong* and *Tong Cao*: "漢方で「通草」というのはこれである", which means: " It (*Mu Tong*) is what's called *Tong Cao* in TCM". This indicated that the names of *Mu Tong* and *Tong Cao* were sometimes mixed.

There is also literature that identifies *Mu Tong* and *Tong Tuo Mu* in detail. *Ben Cao Tu Pu* (《本草图谱》*The Atlas of Materia Medica*)[25] was first published in 1830 by the Japanese herbalist Tokimasa Iwasaki (岩崎常正). This book was based on *Ben Cao Gang Mu* and incorporated medicines produced in Japan itself. *Tong Cao* in this book referred to the herb known as *Mu Tong* today. The book included pictures of *Mu Tong* fruit and recorded its Chinese name: "another name of the fruit is: *Ye Mu Gua* (野木瓜 Stauntonia Chinensis)". The book also stated: "It looks like a *Xiao Mu Gua* (小木瓜 Docynia Delavayi), sweet and delicious to eat, that is what Chen Shiliang's *Shi Xing Ben Cao* called *Fu Yan Zi* (桴棪子 Fruit of Fiverleaf Akebia)". The name was consistent with the records in ancient Chinese materia medica literature. *He Han Sheng Yao* (《和汉生药》*Wakan Crude Drugs*, 1971)[26] written by Kariyone Tatsuo (刈米达夫), included *Mu Tong* (モクツウ; the original plant is アケビ *Akebia quinata* Decne.). *Mu Tong* was included in *Xin Ben Cao Gang Mu* [《新本草纲目(前编)》*New Compendium of Materia Medica* (Preliminary), 1933][27] by Koizumi Eijiro (小泉荣次郎). The book described the morphology of the *Mu Tong* fruit: "The fruit is of the berry type, long ellipsoidal. It is about three inches in length".

5 Efficacy evolution of *Mu Tong* fruit

For the first time, *Yu Zhi Zi* was recorded in the 1977 edition of *Zhong Guo Yao Dian* as the *Mu Tong* fruit. It is bitter in flavor and cold in property. It is effective in soothing the liver and regulating qi, with added effects of expelling worms, promoting blood circulation, alleviating pain, and promoting urination. Clinically, it is often used to alleviate stomach and subcostal pain, dysmenorrhea, dysuria, and other symptoms. The processing method involves washing, drying, and breaking it into pieces before use. In the 1985 edition, its indications were extended to include the liver, gallbladder, stomach, and bladder channels, with added effects of expelling worms and treating amenorrhea, snake bites, and insect bites. No changes were made until 2010. The 2010 edition added the effect of dissipating nodules and the indication for curing subcutaneous nodules and masses, while removing the effects of expelling worms and treating snake and insect bites. No further changes were made in the 2015, 2020, and 2025 editions. From the Tang dynasty to the end of the Qing dynasty, *Yu Zhi Zi* was generally considered sweet in taste, and neutral or cold in property.

The properties, taste, effects, indications, and usage of *Mu Tong* fruit in herbal literature through the ages are summarized (Table 1).

6 Modern clinical anti-tumor applications and experimental research on *Mu Tong* fruit

In recent years, scholars have investigated the chemical composition of the *Mu Tong* fruit using a variety of techniques. Results showed that the *Mu Tong* fruit contained a wide range of constituents such as triterpenes and their corresponding saponins, sugars (mainly reducing sugars) and tannins,[28] lipids[29,30] (mainly unsaturated fatty acids), protein-amino acids (17 amino acids measured), vitamins,[31] and a variety of trace elements. To date, the triterpenoid and saponin compounds of the *Mu Tong* fruit extracted by domestic and foreign scholars (the fruits of *Bai Mu Tong* / *San Ye Mu Tong* / *Wu Ye Mu Tong*) have added up to 37. The anti-cancer properties of *Yu Zhi Zi* are attributed to its rich chemical constituents.

In 2013, among the anti-tumor prescriptions from the outpatient prescriptions of Longhua Hospital affiliated with Shanghai University of Traditional Chinese Medicine, 1,257 prescription samples were randomly selected and analyzed. It was found that the *Mu Tong* fruit was used 598 times, accounting for 47.6% of the total prescriptions.[32] Modern clinical studies have found that the *Mu Tong* fruit has anti-tumor effects. In a study that mined and analyzed the survival data and medication use of

Table 1 The property, flavor, effect, indication, and usage of ***Mu Tong*** fruit

Period	Literature	Property & Flavor	Effect & Indication	Administration Method
659	*Tang Ben Cao* (《唐本草》 *Tang Materia Medica*)	Sweet	Not mentioned	Eat
713–739	*Shi Liao Ben Cao* (《食疗本草》 *Materia Medica for Dietotherapy*)	Neutral property	Regulate intestinal function, improve appetite, **unblock the triple burner**, and eliminate bad qi. Replenish the qi of the five viscera and give people sufficient energy	Eat; Better to eat with seeds Do not eat its skin
739	*Ben Cao Shi Yi* (《本草拾遗》 *Supplement to "The Grand Compendium of Materia Medica"*)	Sweet	Promote stool and urine, disperse and unblock, and **reduce vexation and fever**; **smooth heart, alleviate thirst, and descend the qi**	**Eat without its skin**
935–945	*Shu Ben Cao* (《蜀本草》 *Materia Medica of Sichuan*)	The same as *Tang Ben Cao*		
937–957	*Shi Xing Ben Cao* (《食性本草》 *Materia Medica of Dietary Properties*)	Cold property, not poisonous	Mainly remove heat blocking the digestive system, cure disability to digest, **reduce heat in the triple energizer**	–
974	*Kai Bao Ben Cao* (《开宝本草》 *Materia Medica of the Kaibao Era*)	The same as *Tang Ben Cao*		
1060	*Jia You Ben Cao* (《嘉祐本草》 *Materia Medica of the Jiayou Era*)	Collect all the descriptions of *Tang Ben Cao+Shi Liao Ben Cao+Shi Xing Ben Cao*		
1062	*Tu Jing Ben Cao* (《图经本草》 *Illustrated Classic of Materia Medica*)	Sweet	–	Eat
1108	*Da Guan Ben Cao* (《大观本草》 *Materia Medica of the Daguan Era*)	Collect all the descriptions of *Tang Ben Cao+Shi Liao Ben Cao+Shi Xing Ben Cao+Ben Cao Shi Yi*		
1116	*Zheng He Ben Cao* (《政和本草》 *Materia Medica of the Zhenghe Era*)	Collect all the descriptions of *Tang Ben Cao+Shi Liao Ben Cao+Shi Xing Ben Cao+Ben Cao Shi Yi*		
1403–1424	*Jiu Huang Ben Cao* (《救荒本草》 *Materia Medica for Famine Relief*)	Sweet	**Save lives during famines**	Pick the immature fruit, **boil it with water**, **and usually replace the water**. The mature fruit is edible as well
1565	*Ben Cao Meng Quan* (《本草蒙荃》 *Enlightening Primer of Materia Medica*)	–	Can cure stomach reflux and reduce heat in the triple energizer	–
1578	*Ben Cao Gang Mu* (《本草纲目》 *The Grand Compendium of Materia Medica*)	Sweet, cold, not poisonous Meng Xian said: fruit with neutral property. The southerners often eat it, while the northerners don't know its effect	**Thicken the bowel and stomach**, stimulate appetite, direct bad qi downward from the triple energizer, restore the broken qi of the five viscera, enable humans to speak forcefully, and **harmonize the twelve meridians** (Meng Xian) Reduce the heat in the triple energizer and phlegm heat in the stomach, reflux, and indigestion (Shi Liang) **Quenching thirst and facilitating urination** (Shi Zhen)	**Eat with seed** (Meng Xian said)
1505, 1700	*Ben Cao Pin Hui Jing Yao* (《本草品汇精要》 *Collected Essentials of Species of Materia Medica*)	Sweet, neutral, and cold property	(Chen Cangqi said) Its seeds can promote bowel movements and heal urine retention, reduce vexation and fever, circulate qi, and harmonize the stomach, alleviate thirst, and descend qi (Meng Xian said) Its seeds can dense the digestive system, stimulate appetite, triple energizer, remove bad qi, restore the broken qi of the five viscera, enable humans to speak forcefully, and harmonize the twelve meridians Its seeds can remove heat, blocking the digestive system, cure regurgitation, and reduce heat in the triple energizer	**A pregnant woman mustn't take it**

Table 1 Continued

Period	Literature	Property & Flavor	Effect & Indication	Administration Method
1624	*Ben Cao Hui Yan* (《本草汇言》*Treasury of Words on Materia Medica*)	Sweet, cold property, not poisonous	Reduce heat in the triple energizer, remove heat blocking the digestive system, stimulate appetite, regulate and harmonize the stomach and intestines, and **heal food-denying dysentery caused by heat**. The southerners usually eat it, while the northerners have no idea of its effect	**Boil it with honey** before eating it
1870	*Cao Mu Bian Fang* (《草木便方》*Popular Herbal Prescriptions*)	sweet	The sweet pulp can heal menstrual stasis and internal lesions caused by overexertion, strengthen and nourish marrow and essence, strengthen the yin, **brighten the eyes, and unblock the ears**	–
1936	*Yin Pian Xin Can* (《饮片新参》*New Reference of Prepared Medicines*)	Bitter, cold property	**Internal lesion caused by overexertion, eliminate phlegm and kill parasites, remove mass**	It can be used **raw** or **stir-fried with alcohol**. It can be ground to **be rubbed on the insect and snake bite. People with a cold in the digestive system or suffering diarrhoea shouldn't use it**
1956	*Nan Jing Min Jian Cao Yao* (《南京民间草药》*Nanjing Folk Herbal Medicine*)	sweet	**Healing lumbago**	Soak it with alcohol or decoct it with water. In folklore, people eat it as a fruit
1959	*Herbal Medicine Journal of Jiangsu Province* (《江苏省植物药材志》)	The same as *Nan Jing Min Jian Cao Yao*		
1959	*Journal of Traditional Chinese Medicine* (《中药志》)	Bitter and cold	**Detoxify,** kill parasites, promote urination, and **hasten child delivery**. Heal difficulty in urination and labour. It can be rubbed on the insect and snake bite to detoxify	Pregnant women shouldn't take it
1960	*Herbology* (《药材学》)	Bitter, cold, sweet	**Regulate qi, circulate blood**, kill parasites, detoxify. Used to heal parasitic diseases, to remove abdominal mass, mass generated by qi and retained food, **alleviate the syndrome of chest and diaphragm disturbed by heat,** hasten child delivery, and alleviate pain. External use to treat all insect bites. Can treat lumbago	Pregnant women should be cautious
1975	*Complications of China's Medicinal Herb* (《全国中草药汇编》)	Sweet and warm	**Soothe the liver**, tonify the kidney, alleviate pain	–
1977	*Chinese Pharmacopoeia* (《中国药典》)	Bitter and cold	Soothe the liver and regulate qi, circulate blood, alleviate pain, and promote urination. Used to **alleviate pain in the stomach and subcostal region**, **amenorrhea**, and difficult urination	Pregnant women should be cautious
1988	*Xin Hua Materia Medica Outline* (《新华本草纲要》)	Sweet with a little bit of bitterness, cold	Soothe the liver and regulate qi, circulate blood, alleviate pain, clear and reduce stagnant heat, promote urination, kill parasites. Used to heal liver and stomach qi pain, anorexia caused by heat in the stomach, **polydipsia, dysentery,** alleviate lumbago, pain in the subcostal region, **hernia**, and amenorrhea	–

Notes: The bolded sentences indicate newly discovered efficacies compared to previous records.

322 lung cancer patients, Yang Ming et al.[33] found that *Mu Tong* fruit ranked ninth in frequency of use among 487 Chinese medicinal materials, and was identified as one of the potentially beneficial medications affecting patient survival. The Jiangsu Institute of Traditional Chinese Medicine Hospital Formulation Development Special Project (Y1201) developed *Fu Fang Chang Tai Ke Li* (复方肠泰颗粒 Compound Intestinal Granules),[34] which contained *Yu Zhi Zi* for the treatment of colorectal cancer and proved effective. In the treatment of liver cancer by Guo Yong,[35] intrahepatic cholangiocarcinoma[36] and lung cancer[37] by Xu Zhenye, colorectal cancer by Li Qi,[38] prostate cancer by Qi Yuanfu,[39] Ovarian cancer by Pu Bingkui,[40] and hepatocellular carcinoma

and esophageal cancer by Pan Guoxian,[41] *Yu Zhi Zi* is commonly used in dosages ranging from 9 g to 20 g.

Fang Zhaoqin et al. demonstrated through multiple batches of *in vivo* and *ex vivo* experiments that the main active components of the *Mu Tong* fruit, responsible for inhibiting tumor cell proliferation, were enriched in its seeds.[42] These seed extracts could effectively inhibit the proliferation of various hepatocellular carcinoma cells, including SMMC-7721, HepG2, and HuH7, etc.[43] Lu Wenli et al. found that *Mu Tong* fruit extracts inhibited the proliferation of HepG2 hepatocellular carcinoma cells.[44] Subsequent studies indicated that *Yu Zhi Zi* inhibits the growth of HepG2 cells by downregulating Mdm2, activating p53, and causing the HepG2 cells to stagnate in S phase.[45] In addition, Akebia saponin E has been shown to inhibit the kinase activity of PIKfyve (phosphoinositide kinase containing a FYVE-type finger). This must be used to treat human Hepatocellular carcinoma potentially. Lu Tao et al. found that the *Mu Tong* fruit at different maturity stages differ in antitumor efficacy and chemical composition; as the *Mu Tong* fruit matures, the components that inhibit hepatocellular carcinoma cell proliferation and induce endoplasmic reticulum stress are enriched, suggesting that harvesting the *Mu Tong* fruit at full maturity may enhance its medicinal value.[46] *Mu Tong* fruit[47] and its ethanol extracts[48] has also shown synergistic antitumor effects when combined with *Lei Gong Teng* (雷公藤 Tripterygium Wilfordii), further inhibiting tumor cell proliferation.

Recently, with the revival of TCM in China, research on the pharmacological efficacy of Chinese herbal medicines has been gaining momentum abroad. The fruits of *Wu Ye Mu Tong* and *San Ye Mu Tong* contain triterpene saponins, which can be extracted from the seeds and leaves. The essential oil extracted from the fruit comprises limonene, eugenol, octanal, and p-cymene. These fruits can promote ethanol metabolism and have hepatoprotective and antimicrobial effects.[49] Arjunolic acid, a compound isolated from the fruits of *San Ye Mu Tong*, has shown the potential for antidepressant activity by modulating the AMPK, SIRT1, and Notch1 signaling pathways.[50] The methanol extract of *Wu Ye Mu Tong* oilseeds exhibits unique activities that enhance Gag aggregation and induce abnormal cleavage of Gag, thereby suppressing virion release and preferentially killing HTLV-1-infected cells.[51] Another research shows that the polysaccharides extracted from *San Ye Mu Tong* fruit using an aqueous two-phase system can prolong the lifespan of *C. elegans* and enhance antioxidant enzyme activities, while also reducing lipofuscin accumulation and malondialdehyde levels in aging worms.[52] Hederagenin, a triterpenoid extracted from the *Mu Tong* fruit, can prevent the decline of mitochondrial membrane potential, reduce intracellular reactive oxygen species (ROS) production, and thus decrease the apoptosis induced by CORT via activation of the PI3K/AKT pathway.[53]

Modern research mainly focuses on the anti-tumor mechanisms of *Mu Tong* fruit, but most studies remain limited to *in vitro* or animal experiments, and evidence for clinical transformation is insufficient. In addition to the anti-tumor effects, many other effects of *Mu Tong* fruit have been verified by experiments. However, modern pharmacopoeias have removed traditional effects such as "strengthening and nourishing the marrow and essence" due to a lack of sufficient experimental evidence, which may overlook its potential nutritional and immunomodulatory value.

7 Discussion

In ancient literature, the effect of "regulating intestinal function" was emphasized in literature from the Tang dynasty, while "providing sufficient energy" was highlighted in Qing dynasty sources. These two effects seem contradictory, suggesting *Mu Tong* fruit may exert a bidirectional regulation function. In addition, *Shi Liao Ben Cao* recorded that the fruit pulp was consumed together with its kernel, and most kernels can moisten dryness and promote bowel movements, such as *Huo Ma Ren* (火麻仁 Cannabis fructus), *Ku Xing Ren* (苦杏仁 Armeniacae Semen Amarum), *Tao Ren* (桃仁 Persicae semen). Therefore, further clinical studies are needed to clarify the specific pharmacological effects of the *Mu Tong* fruit. Modern literature of the *Mu Tong* fruit retains the effects of soothing the liver and regulating qi and adds the effects of circulating blood and alleviating pain, dispersing masses, and promoting diuresis. Clinically, the *Mu Tong* fruit is commonly used in the treatment of hepatocellular carcinoma with the "liver qi stagnation" pattern and the "damp-heat in the liver and gallbladder" pattern. These applications suggest that the most prominent effect of *Mu Tong* fruit is to ease the liver and regulate qi.

Initially, *Yu Zhi Zi* was not an alternative name for the *Mu Tong* fruit. After the publication of *Ri Hua Zi Ben Cao* (approximately 908–923 AD) and before the publication of *Yin Pian Xin Can* (1936), the name "*Mu Tong* fruit" appeared in historical herbal literature as either the standard or an alternative name for the Trichosanthes cucumeroides seeds. During this period, the most comprehensive compilation of the efficacy of the *Mu Tong* fruit can be found in *Ben Cao Gang Mu*. The content regarding *Mu Tong* fruit in *Ben Cao Bei Yao* (《本草备要》*Essential Compendium of Materia Medica*, 1694) was refined and simplified based on the *Ben Cao Gang Mu*, with its exaggerated efficacy removed. *Ben Cao Cong Xin* (《本草从新》*Materia Medica Revised and Updated*,1757) did not include *Yu Zhi Zi*, noting the reason as "now there is no such medicine (而今并无是药者)". From then on, the Qing dynasty worked on the materia medica, generally omitting *Yu Zhi Zi*, possibly because it was genuinely rare or because its efficacy was exaggerated. In 1936, *Yin Pian Xin Can* listed it as

one of the alternative names for the *Mu Tong* fruit. In 2005, *Yu Zhi Zi* was finally recognized as the standard name for the *Mu Tong* fruit in *Zhong Guo Yao Dian*.

It is noteworthy that the 2005 edition of *Zhong Guo Yao Dian* established *Yu Zhi Zi* as the standard name for *Mu Tong* fruit. Prior to this, studies on the composition and efficacy of *Yu Zhi Zi* might have used materials other than the actual *Yu Zhi Zi*. Conversely, some research subjects that do not appear to be genuine *Yu Zhi Zi* are in fact genuine, as the articles referred to it by its alternative names (such as *Ba Yue Gua* or *Ba Yue Zha*). After 2005, many studies have continued to use alternative names for *Yu Zhi Zi,* though most now reference its scientific name according to *Zhong Guo Yao Dian*. This may be because alternative names like *Ba Yue Zha* and *Ba Yue Gua* have been widely recognized and used in rural areas since ancient times. For the purposes of rural revitalization and promoting TCM, the name *Yu Zhi Zi* was not adopted. Medical practitioners should pay attention to distinguishing these references when reading literature.

In summary, the article clarifies the origins and systematically examines the historical evolution of names such as "*Yu Zhi Zi*", "*Ba Yue Zha*", and "*Yan Fu Zi*", explicitly pointing out that the term "*Yu Zhi Zi*" refers to different substances in ancient and modern literatures. This will help medical practitioners accurately understand the correspondence of medicinal names when reading classical and contemporary literature, avoiding misuse. Summarizing its medicinal value to promote the rational development and utilization of local medicinal resources supports the rural revitalization strategy. Through a research methodology that integrates historical and contemporary comparative analysis, the study provides historical and documentary evidence for establishing "*Yu Zhi Zi*" as the standard name in *Zhong Guo Yao Dian*. This will contribute to further improving the naming and origin standards of TCM, advancing the standardization system of Chinese medicine, and supporting its modernization and internationalization.

8 Conclusion

The eventual inclusion of *Yu Zhi Zi* as the official name for the *Mu Tong* fruit in the official pharmacopoeia can be attributed to the following reasons. First, both *Yu Zhi Zi* and the *Mu Tong* fruit are fruits of climbing plants, which can easily lead to morphological confusion. Second, the *Mu Tong* fruit has numerous alternative names, and *Yu Zhi Zi* historically appeared as one of these alternative names under the entry for the *Mu Tong* fruit in ancient texts, making it a candidate for the official name during the revision of *Zhong Guo Yao Dian*. In modern times, the TCM market also refers to Fructus Akebiae as "*Yu Zhi Zi*" — a case where repeated misuse could potentially establish it as a standard name. The fact that the modern pharmacopoeia's *Yu Zhi Zi* corresponds to the ancient *Mu Tong* fruit complicates researchers' efforts to trace the origins of their respective therapeutic effects in classical literature, and also impacts clinical guidance for medication use. The study attempts to clarify the academic origin and correct misconceptions of the nomenclature of *Yu Zhi Zi* (Fig. 4), and hope that this will serve as a convenient reference for later generations of medical practitioners.

Notes

1. Lardizabalaceae is a family belonging to a primitive subclass of dicotyledons characterized by the presence of a perianth. It comprises nine genera and about fifty species, most of which are found in eastern Asia, with only two genera distributed in Chile, South America. In China, the family includes seven genera and forty-two species, two subspecies and four varieties, occurring across both northern and southern regions, though most are concentrated in provinces south of the Yangtze River.
2. The content in *Ben Cao Gang Mu* (《本草纲目》) is *Yan Fu Zi* (燕覆子) and *Wu Fu Zi* (乌覆子) in *Xin Xiu Ben Cao* (《新修本草》 *Newly Revised Materia Medica*).
3. As ancient Chinese literature recorded, the vine of Akebia quinata was known as *Tong Cao* (通草) in folk tradition. Because *Shi Liao Ben Cao* put *Tong Cao* under the entry of *Yan Fu Zi*, many ancient herbal books in later generations took *Tong Cao* as the official name of Akebia quinata. Until *Tu Jing Ben Cao* (1062AD) listed *Tong Cao* and *Yu Zhi Zi* separately, and clarified that "the ancient formula used *Tong Cao*, which is today's *Mu Tong* (古方所用通草，兼今木通)", *Mu Tong* finally became the official name of Akebia quinata again. So the modern *Mu Tong* was called *Tong Cao* before the publication of *Tu Jing Ben Cao*. In this article, some descriptions of the fruit morphology and efficacy of Fructus Akebiae are taken from the entry of *Tong Cao*.

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Author contributions

LU Tao participated in collecting materials and writing the version in Chinese. SHI Xiaru and BAO Wenchu participated in translating the article from Chinese to English. SHI Xiaru supervised all research activities and

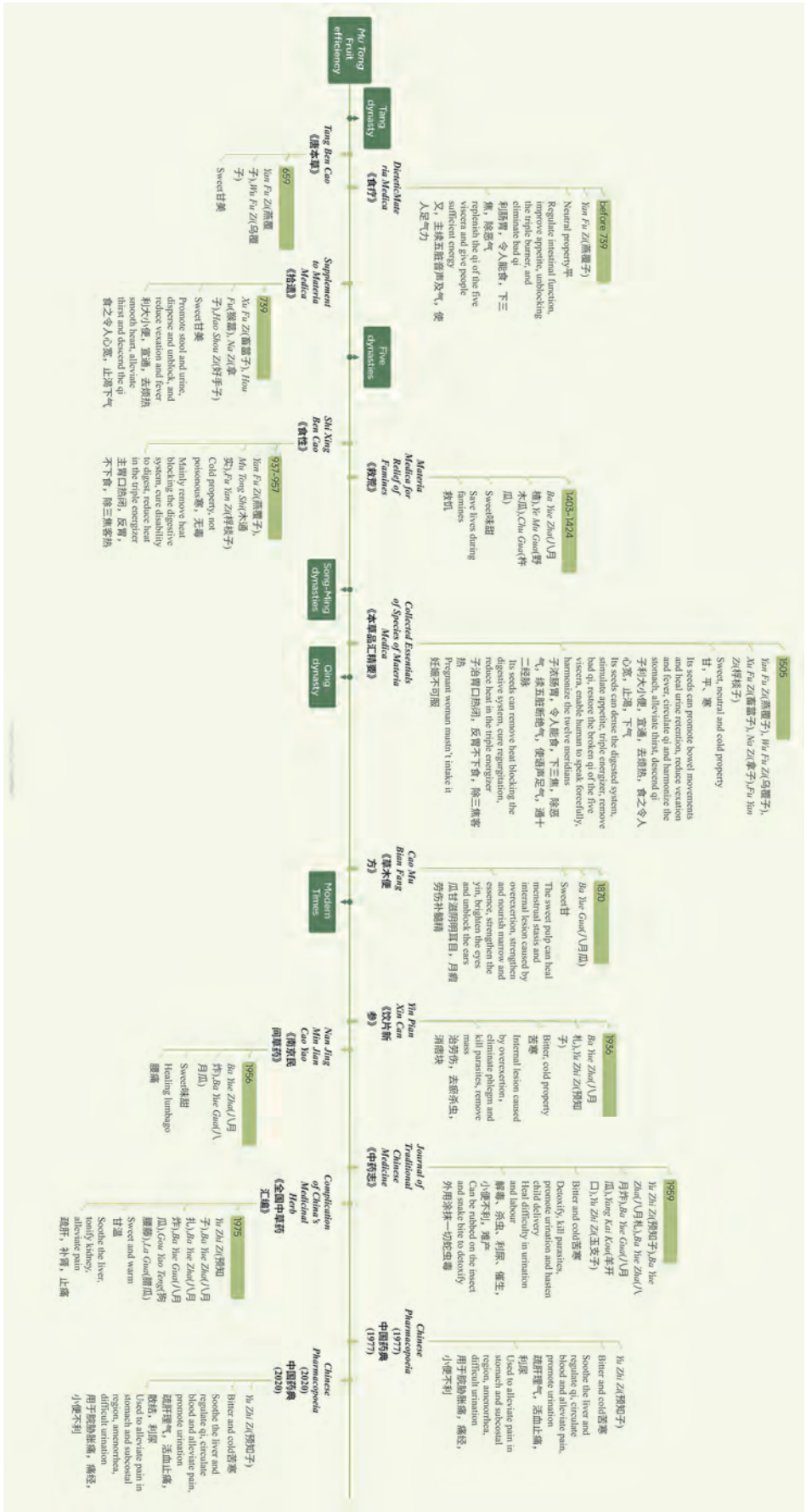


Figure 4 Timeline of *Mu Tong* fruit efficacy evolution (source with permission from: picture made by the authors)

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Ethical approval

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of interest

The authors declare no financial or other conflicts of interest.

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Carrying Forward the Essence of Shi's Orthopedics and Traumatology, Forging New Paths in Manipulative Medicine — A Chronicle of Professor Zhan Hongsheng's Team's Dedicated Work in Spinal Manipulative Medicine

Professor Zhan Hongsheng (詹红生), as the national representative inheritor of Shanghai Shi's Orthopedics and Traumatology, has led his team in long-term dedication to the research of Chinese spinal manipulative medicine. He has achieved outstanding accomplishments in areas such as school inheritance, theoretical construction, technological innovation, standard establishment, scientific research translation, and talent cultivation, thereby advancing the modernization, standardization, and internationalization of Chinese spinal manipulative medicine.

The Foundation: The Essence of Shi's Orthopedics and Traumatology

Shanghai Shi's Orthopedics and Traumatology, a healing tradition sustained over 156 years, has been recognized as a National Intangible Cultural Heritage of China. It is distinguished by a systematic, coherent, and distinctive theoretical and technical framework for injury management. In manual therapy, the school has systematized twelve core manipulative techniques—tugging, extending, pressing, reducing, dragging, grasping, lifting, supporting, kneading, shaking, and rotating/twisting—which are applied in the treatment of fractures, dislocations, and sinew injuries. Furthermore, sinew injuries are classified into three categories according to severity: subtle, moderately evident, and visibly apparent structural changes. The latter two categories are regarded as optimal indications for manual intervention. Notably, since the 1950s, Shi's Orthopedics and Traumatology has incorporated X-ray imaging as an auxiliary diagnostic tool in clinical practice. This approach underscores not only the technical sophistication of its manipulations but also the imperative of thorough clinical evaluation and diagnosis prior to treatment—a principle that ensures both safety and therapeutic efficacy and embodies the distinctive clinical reasoning characteristic of Shi's Orthopedics and Traumatology.

The Construction: A Chinese School of Spinal Manipulative Medicine

With the dramatic increase in chronic sinew-bone disorders and sinew injuries, Professor Zhan and his team embarked on new explorations. First, focusing on the core pathogenesis of manual therapy, they conducted systematic literature reviews and clinical research, proposing “sinew off-position” and “joint subluxation” as independent disease entities. These have been incorporated into the *National Standard for Classification and Codes of Diseases and Patterns of Traditional Chinese Medicine* (GB/T 15657-2021) and included in the extension module for traditional medicine conditions of the *International Classification of Diseases (11th Revision)* (ICD-11). Furthermore, they have been integrated into the national undergraduate planning textbook *Orthopedics and Traumatology of Traditional Chinese Medicine*, establishing them as the core guiding theory for manual therapy. Building on this foundation, Professor Zhan led the development of the clinical practice guideline for sinew off-position and joint subluxation, employing the Delphi method to establish diagnostic criteria for both conditions. Concurrently, based on precise assessment results encompassing qualitative, locational, and directional evaluations, the team formulated targeted treatment protocols involving sinew-regulation, bone-setting, and acupoint-pressing techniques, complemented by appropriate therapeutic exercises (气功). This work has culminated in a systematic and standardized theoretical and technical framework for manual diagnosis and treatment. Professor Zhan authored the academic monograph *Spinal Manipulative Medicine*, which received the second prize of the Academic Works Award from the China Association of Chinese Medicine. An English edition of the work is forthcoming.

The Progress: Advancing Contemporary Spinal Manipulative Medicine as a Discipline

There is substantial work yet to be done in further improving the theoretical and technical system of spinal manipulative medicine. For instance, it is essential to conduct standardized, rigorous clinical evaluation studies with evidence-based medicine methods for the diagnosis and treatment of conditions such as sinew off-position and joint subluxation. Additionally, employing approaches like model organism research and biomechanics to investigate the pathophysiological mechanisms of these disorders, as well as the mechanisms of effective therapeutic techniques, will further enrich contemporary theoretical frameworks of spinal manipulative medicine. Such research will also guide clinical applications and enhance the scientific basis of diagnosis and treatment. Furthermore, exercise plays an indispensable role in managing chronic sinew-bone disorders. Complementing manual therapy, it forms a synergistic treatment approach. In-depth studies on the cooperative effects and underlying mechanisms of these two modalities represent another critical area for future research.

From the perspective of the global trends of manual medicine both domestically and internationally, chiropractic offers considerable reference value for the development of Chinese spinal manipulative medicine. With the growing demand for health and the shift in medical paradigms, the convergence and elevation of Eastern and Western research will breathe new life into Chinese spinal manipulative medicine—an age-old yet ever-young branch of healing—unlocking its immense vitality and promise.





