CHAPTER 1

First Week

I. General Information

*Chinese materia medica and its science*

Chinese materia medica refers to the botanical, mineral, and zoological substances applied by traditional Chinese medicine as a primary weapon for preventing and treating diseases.

Some people are of the wrong impression that Chinese materia medica are all produced in China. However, some medical substances, known as imported goods “Bó Lái Pǐn” in ancient time, are either from other parts of the world such as *Shā Rén* (Fructus Amomi, villous amomum fruit), *Xuè Jié* (Sanguis Draconis, dragon’s blood), and *Pàng Dà Hǎi* (Semen Sterculiae Lychnophorae, sterculia seed), or have been introduced and planted in China, such as *Shā Rén* (Fructus Amomi, villous amomum fruit). The antibiotics and biological products that made in China are called western medicine instead of Chinese materia medica.

Back in early history when people relied on collecting plants and hunting animals as their main source of food, they gradually recognized the beneficial or harmful effects of those plants or animals on human body. This is the original knowledge of Chinese materia medica. With a time-honored history of civilization tracing back to 6000 years ago, China has a large population, vast territory, and abundant resources, and Chinese people have accumulated rich medical experiences in fighting for survival and disease prevention and treatment, and gradually built up the theoretical knowledge of Chinese materia medica. About 2000 years ago when *The Yellow Emperor’s Inner Classic* (黄帝内经, Huáng Dì Nèi Jīng)
Introduction to Chinese Materia Medica

(including Basic Questions and the Spiritual Pivot) and Shen Nong’s Classic of the Materia Medica (神农本草经, Shén Nóng Běn Cāo Jīng) have been compiled, a comprehensive theoretical system of Chinese materia medica has formed. The former is a systematical expression of the correlative theories of Chinese materia medica and principles of their application, such as four natures, five flavors, relations between the five-zang organs and medical natures and flavors, and medicinal selection for five-zang organs’ diseases, while the latter focuses on the detailed description of 365 herbs in terms of natures, flavors, actions, and indications.

Science of Chinese Materia Medica, as one of the primary disciplines of traditional Chinese medicine, mainly expounds the basic knowledge of Chinese medicine in terms of source, nature, processing, actions, indications, as well as its basic theories and administration.

In ancient China, Science of Chinese Materia Medica and correlative works were called “materia medica” (本草, Běn Cāo) because herbal medicine is a major component. There are abundant books on materia medica in history with a continuous accretion of new herbs together with a revaluation and addition of new uses. For instance, Shen Nong’s Classic of the Materia Medica (神农本草经, Shén Nóng Běn Cāo Jīng) is the source and archetype of Chinese material medica, from this beginning, the literatures developed in terms of theories of traditional Chinese medicine and addition of new herbs. For instances, Newly Revised Materia Medica (新修本草, Xin Xiū Běn Cāo) in Tang dynasty records 844 entries, Materia Medica Arranged According to Pattern (证类本草, Zhèng Lèi Běn Cāo) in Song dynasty embraces 1558 items, The Grand Compendium of Materia Medica (本草纲目, Běn Cāo Gāng Mù) in Ming dynasty contains 1892 species, and contemporary Encyclopedia of Materia Medica (中药大辞典, Zhōng Yào Dà Cí Diǎn) and Chinese Materia Medica (Zhōng Huá Běn Cāo) list 5767 and 8980 entries, respectively. On the one hand, it is a reflection of China’s wealth of China is rich in Chinese medicinals resources, and on the other hand, Science of Chinese Materia Medica is rich in content with great numbers of Chinese medicinals. The learner should also remember that Chinese materia medica is not easy to learn.

With great achievements, Science of Chinese Materia Medica not only plays an essential role in the historical development of traditional Chinese medicine in China and medicine in neighboring countries, but also has
exerted important influences on the development of medicine across the world. Studies on Chinese materia medica, especially crude medicinals, become one of the hotspots in the international medical fields and new products are extracted from Chinese medicinals every year. For instance, medicines prepared from active ingredients extracted from Yín Xìng Yè (Folium Ginkgo, ginkgo leaf), which is known for its excellent actions of preventing and treating cardiovascular diseases, bring great profits to European pharmaceutical companies.

How to learn science of Chinese materia medica

Science of Chinese Materia Medica is the compulsory professional course, students need to have a solid grasp of basic knowledge of Chinese medicinals before they continue with further studies in formulas, internal and external medicines, gynecology, and pediatrics of traditional Chinese medicine. Chinese materia medica is the major tool in preventing and treating disorders and a practitioner of Traditional Chinese medicine must have profound knowledge on its theories and medicinals, just like someone cannot be a soldier if he does not know how to use weapons. However, so many books about Chinese materia medica covering extremely enormous contents are available now, how should we study it?

The first step is to understand the basic theories of traditional Chinese medicine, such as visceral manifestation, etiology, pathogenesis, principles of pattern differentiation, and treatment principles and methods, as Chinese materia medica theory is an important component of traditional Chinese medicine theories, and theories, methods, formulas and medicinals are inseparable. Without knowing the basic theories of traditional Chinese medicine, students cannot understand actions and indications of Chinese medicinals with a failure to apply. From this perspective, Western medicine and traditional Chinese medicine are greatly different from each other. If a clear diagnosis is made, the former is used directly to treat the disease in most cases, which is relatively easy to understand and master. While the latter aims at treatment based on a pattern, which must be identified by differentiating the nature of disease, yin or yang, exterior or interior, cold or heat, and deficiency or excess. There are also a few formulas that contain only one medicinal. The absence of the basic theories of traditional Chinese medicine
will make it impossible to study Science of Chinese Materia Medica, let alone applying it in prevention and treatment of diseases. Hereby, Shanghai Scientific and Technical Publisher and The Commercial Press (Hong Kong) Limited compiled and published *Learn to Prescribe Chinese Medical Formulas in 100 days* that covers the basic theories of traditional Chinese medicine. Reading it or other theoretic books of traditional Chinese medicine first will facilitate your understanding of this book; mastery of traditional Chinese medicine theories will make it easier to understand theories of Science of Chinese Materia Medica.

When studying Chinese materia medica, one needs to focus on correlative basic theories, and the properties, actions and indications of commonly used medicinals. This book aims to help learners to master the properties, actions and indications of around 200 commonly-used Chinese medicinals in just 100 days. The learners are required to create summaries and make comparisons among medicinals with similar actions to identify their similarity and differences, which will make it easier to memorize, and also lays a foundation for clinical application. The column of Mnemonics is designed to assist the learners to remember the properties, actions and indications of medicinals, the column of Simple and Effective Formulas aims to provide references for the reader to understand the actions and indications of medicinals, and the column of Daily Practices at the end of each section covers questions that are worth thinking over and beneficial for good comprehension.

Undoubtedly, students are supposed to develop their skills of Chinese medicinal both theoretically and practically in treatment of various diseases, and they will be really impressed with the actions and indications of medicinal when certain disorders are cured by applying those medicinal plants.

**Classification of Chinese medicinals**

There are several different methods to classify traditional Chinese medicinals. In ancient materia medica works, they are classified by:

1. The properties and actions of medicinals.
   
   For instance, *Shen Nong’s Classic of the Materia Medica* (神农本草经, *Shén Nóng Běn Cǎo Jīng*) listed medicinals with mild nature and
boosting effect as the upper grade, those with drastic nature and purgative effect as the lower grade, and others are the middle grade.

2. Sources of medicinals.
   For instance, *The Grand Compendium of Materia Medica* (本草纲目, *Běn Cǎo Gāng Mù*) recorded the type of water, fire, earth, golden stone, grass, grain, vegetable, fruit, wood, tool, insect, scale, shell, bird, beast, and human being.

3. Medicinal parts.

4. Actions of medicinals.
   In modern and contemporary Chinese medicine works, medicinals are classified by actions into exterior-releasing, heat-clearing, purgation, wind-dispelling and dampness-eliminating, dampness-eliminating, qi-rectifying, digestion-promoting, worm-expelling, blood-regulating, phlegm, cough and panting-relieving, mind-calming, liver-calming and wind-distinguishing, orifices-opening, tonic, astringent, emetic, and external-application types. Each method has its advantages and disadvantages; classification based on source of medicinal cannot reflect its actions, whereas classification method employing certain predominant action cannot objectively reflect its overall actions, although it is helpful for memorizing and comparison. For instance, Má Huáng (Herba Ephedrae, ephedra herb) is capable of both releasing the exterior and arresting panting but is categorized into the medicinal that release the exterior. In this book, medicinals are classified by actions and learners are expected to pay more attention to make comparison between medicinals that have similar actions.

**Daily practice**

1. What is Chinese materia medica? What are the main contents of Science of Chinese Materia Medica?
2. What are the good ways to study Chinese materia medica?
3. How is Chinese materia medica classified?
II. Property Theory of Chinese Materia Medica

The “Property theory” section in this book includes information about three aspects of Chinese medicinals that explained and interpreted with unique theories of traditional Chinese medicine. One is the four qi and five flavors (四气五味, Sì Qì Wǔ Wèi), one is the ascending, descending, floating, and sinking, the other is channel entry. Property theory of Chinese materia medica and other basic theories of traditional Chinese medicine are closely related and constitute theoretical system of traditional Chinese medicine.

The four Qi and five flavors (四气五味, Sì Qì Wǔ Wèi)

Also known as Qì Wèi 气味 or Xìng Wèi 性味, it is a basic theory used to illustrate the actions of medicinals and also the core of property theory. From the perspective of Traditional Chinese medicine, medicinals have different natures and flavors that determine their therapeutic effects, and therefore they can rectify and treat various pathogenic visceral changes either functionally or organically. That is to say, learners should know the natures and flavors of medicinals before learning their actions. This theory includes two aspects, one is the four qi and the other is the five flavors.

[Four Qi] Four qi is also called “四性 Sì Xìng”, cold, hot, warm, and cool are the four natures of Chinese medicinal. It is one of the characteristics of traditional Chinese medicine in understanding medicinal properties. The cold, hot, warm, or cool nature does not refer to the temperature of medicinal, but a designation based on a patient’s reaction to the medical substances. For instance, medicinals that generate hot sensation and relieve cold symptoms such as abdominal pain relieved by warmth, watery diarrhea or diarrhea with undigested food, absence of thirst, ice-cold hands and feet, white moist tongue coating, pale tongue, and deep thin pulse are warm or hot in nature. These medicinals include Fù Zĭ (Radix Aconiti Lateralis Praeparata, Monkshood), Ròu Guì (Cortex Cinnamomi, Cassia Bark), Gān Jiāng (Rhizoma Zingiberis, Dried Ginger Rhizome), Jú Pí (Pericarpium Citri Reticulatae, Tangerine Pericarp), and Shēng Jiāng (Rhizoma Zingiberis Recens, Fresh Ginger). Whereas, medicinals that
eliminate heat symptoms such as high fever, thirsty with a desire for cold drink, restlessness, yellow and dry tongue coating, red tongue, and slippery rapid pulse are cold or cool in nature. These medicinals include Huáng Lián (Rhizoma Coptidis, golden thread), Dà Huáng (Radix et Rhizoma Rhei, rhubarb root and rhizome), Shí Gāo (Gypsum Fibrosum, gypsum), Jú Huā (Flos Chrysanthemi, chrysanthemun flower), and Sāng Yè (Folium Mori, mulberry leaf).

That is to say, these four qi are summaries based on patient’s reactions to the medicinal substances. *Shen Nong’s Classic of the Materia Medica* (神农本草经, *Shén Nóng Běn Cǎo Jīng*) noted that “cold diseases must be treated with hot medicinals, and hot diseases must be treated with cold medicinals”, indicating the basic principle of traditional Chinese medicine treatment is to correct imbalance of yin and yang as well as of qi and blood with properties of different medicinals. Meanwhile, medicinal properties are credited by long-term observation of its therapeutic effects on imbalance of yin and yang as well as qi and blood with properties of different medicinals. Meanwhile, medicinal properties are credited by long-term observation of its therapeutic effects on imbalance of yin and yang as well as qi and blood. Medicinals effective for cold pattern are considered hot in nature, and medicinals effective for heat pattern are cold natured. Property theory is closely associated with etiology, pathogenesis and treatment based on pattern differentiation.

**[Five Flavors]** Five flavors refer to the degree to which a medicinal has a taste, namely acrid, sweet, sour, bitter, and salty. In traditional Chinese medicine, the taste of foods or medicinals has specific effects on the body. *Basic Questions* (素问, *Sù Wèn*) stated the basic summary of “acrid substances scatter, sour substances astringe, sweet substances moderate, bitter substances drain, and salty substances soften”. Together, five flavors and four qi constitute the unique theoretical pharmacology system of Science of Chinese Materia Medica.

Acrid substances move and disperse. Dispersing means to scatter and dissipate the exterior pathogens, while moving refers to remove qi stagnation, and unblock the obstructed channels, collaterals, and orifices. Therefore, medicinals that used to relieve the exterior such as Má Huáng (Herba Ephedrae, Ephedra Herb), Guì Zhī (Ramulus Cinnamomi, Cassia Twig), Zī Sū Yè (Folium Perillae, Perilla Leaf), and Bò He (Herba Menthae, Field Mint) are acrid, while medicinals that regulate qi such as Jú Pí (Pericarpium Citri Reticulatae, Tangerine Pericarp), Mù Xiāng (Radix Aucklandiae, Common Aucklandia Root), Shā Rén (Fructus
Amomi, Villous Amomum Fruit), and Xiāng Fù (Rhizoma Cyperi, Nutgrass Galangale Rhizome) are also acrid.

Bitter substances dry and drain. Drying means to eliminate dampness, and draining refers to dispel pathogenic heat outward and drain pathogenic toxins downward. For this reason, medicinals that used for relieve dampness such as Hòu Pò (Cortex Magnoliae Officinalis, Magnolia Bark) and Dú Huó (Radix Angelicae Pubescentis, Double Teeth Pubescent Angelica Root) are bitter; and medicinals that clear heat and resolve toxins or subdue fire, such as Huáng Lián (Rhizoma Coptidis, Coptis Rhizome), Lóng Dān Cāo (Radix et Rhizoma Gentianae, Chinese Gentian), Zhī Zī (Fructus Gardeniae, Cape Jasmine Fruit), and Huáng Bāi (Cortex Phellodendri Chinensis, Amur Cork-tree Bark) are also bitter.

Sweet substances tonify qi, blood, yin, and yang, harmonize and relax tension, and moderate the effects of other medicinals. That is why most tonics are sweet, such as Gān Cāo (Radix et Rhizoma Glycyrrhizae, Liquorice Root), Fēng Mì (Mel, Honey), and Dà Zāo (Fructus Jujubae, Chinese Date), they can also be used in relax tension. Besides, medicinals that nourish, moisten the intestines to promote defecation, and moisten the lung to dissolve phlegm are also sweet.

Sour substances astringe fluid and qi and prevent or reverse the abnormal leakage, such as cough, sweating, seminal emission, enuresis, and diarrhea. Medicinals with sour taste include Wū Wèi Zī (Fructus Schisandraceae Chinensis, Chinese Magnolivine Fruit), Wū Méi (Fructus Mume, Smoked Plum), and Shí Liú Pí (Pericarpium Granati, Pomegranate Husk).

Salty substances soften hard masses, fixed abdominal masses of definite shape, or movable abdominal masses of indefinite shape, such as lumps (benign or malignant tumor), scrofula (tuberculosis of lymph nodes), and Yīng Líu (goiter). These salty medicinals include Mǔ Lì (Concha Ostreae, Oyster Shell), Kūn Bù (Thallus Laminariae, Kelp), and Hǎi Zāo (Sargassum, Seaweed). Besides, owning to their effects on softening hard masses, they are also commonly used for constipation with dry stools in the intestines, and sores and masses of external diseases.

Astringent taste and sour taste have similar actions of astringing and are usually part of the same medicinal. Such medicinals include Jīn Yīng Zǐ (Fructus Rosae Laevigatae, Cherokee Rose Fruit) and Shí Liú Pí.
(Pericarpium Granati, Pomegranate Husk). However, some medicinals are astringent but not sour, such as Lóng Gǔ (Os Draconis, Dragon Bones), Qiàn Shí (Semen Euryales, Euryale Seed), and Lián Zǐ (Semen Nelumbinis, Lotus Seed). Substances that have none of these tastes are said to be bland, “bland taste affiliated to sweet taste” mainly acts to promote urination and percolate dampness, and medicinals that disinhibit water retention such as Fú Líng (Poria, Indian Bread) and Zhū Líng (Polyporus, Polyporus) are bland-tasted.

The concept of flavor is complicated, as different medicinals have different tastes or distinctive taste even though with similar actions, some medicinals may taste the same but be variously thick or thin; and some have multiple flavors, such as sour sweet, pungent bitter, and pungent sweet. Medicinals with multiple tastes also have multiple actions, for instance, sour and sweet substances such as Shān Zhū Yú (Fructus Corni, cornus) can tonify and astringe.

In theories of Science of Chinese Materia Medica, the flavor of a medicinal partly determines its therapeutic effects. They are precious inheritance from our ancestors, and most of them are practical. However, it has certain one-sided limits due to historical conditions, and modern researches reveal that Chinese medicinals contain multiple active ingredients, which have shown different pharmacological effects, the flavor of its effective component contributes partially to its actions. For instance, tonics contain saccharides that taste sweet, exterior-releasing and qi-rectifying medicinals contain volatile oil that taste acrid, heat-clearing and toxin-relieving medicinals contain alkaloid that taste bitter, and astringents contain organic acid that taste sour. However, for some active ingredients, flavors are not inevitably connected to actions. Therefore, in Science of Chinese Materia Medica, the flavor of medicinal refers to its original taste and also the taste that deductively grouped taking into account its actions. Báì Sháo (Radix Paeoniae Alba, White Peony Root), for instance, does not taste sour but is grouped into medicinal with sour flavor based on its actions of astringing yin and softening the liver. In this way, the flavor of medicinal and its actions are most closely related to each other, that is to say, knowing the flavor provides a preliminary clue regarding its actions; however, on the other hand, the original taste of few medicinals is different from that recorded in Science of Chinese Materia Medica.
[Relationship between four qi and five flavors] Each medicinal has four qi (cold, hot, warm, and cool) and five flavors (acrid, sweet, sour, bitter, and salty). Understanding the properties of medicinals should take both qi and flavors into account. This book elaborates upon the qi and flavor of every medicinal, which are regarded as necessary foundations for further analysis of their actions. For instance, Huáng Lián (Rhizoma Coptidis, Coptis Rhizome) is cold in qi and bitter in flavor and therefore capable of clearing heat, drying dampness, and draining downward; Hòu Pò (Cortex Magnoliae Officinalis, Magnolia Bark) is warm in qi and pungent-bitter in flavor and therefore effective in warming the middle jiao and moving qi to dry dampness.

In Science of Chinese Materia Medica, the action of medicinal can be distinguished by certain qi and flavors. Medicinals with the same flavor (acrid, sweet, sour, bitter, or salty) can present with different qi (cold, hot, warm, or cool); and vise versa. For this reason, different medicinals may act differently. Má Huáng (Herba Ephedrae, Eph Edra) and Bò He (Herba Menthae, Field Mint), for instance, are both acrid in flavor and can release the exterior and induce sweating, but the former is warm in nature and therefore suitable for wind-cold exterior pattern, and the latter is cool in nature and therefore appropriate for wind-heat exterior pattern; Huáng Lián (Rhizoma Coptidis, Coptis Rhizome) and Shēng Dì (Radix Rehmanniae, rehmannia root) both are cold in nature and can clear heat, but the former is bitter in flavor and therefore capable of clearing heat and drying dampness and suitable for damp-heat disorders, while the latter is sweet in flavor and hereby effective in nourishing yin, engendering fluid, and cooling blood and appropriate for yin fluids deficiency, yin deficiency resulting in vigorous fire, and blood heat. The actions of every medicinal are predominated by either four qi or five flavors, which are heavily dependent on the specific situation.

Daily practices

1. What is the theory of medicinal property of Chinese materia medica? What are the best ways to master them comprehensively?
2. What is the concept of four qi and five flavors? What are their actions?
3. What are the relationships between four qi and five flavors?
Ascending and descending, floating and sinking

the theory of ascending, descending, floating and sinking refers to four directions or trends of medicinal actions. Complementary to four qi and five flavors theories, it plays an essential role in comprehensively understanding properties of Chinese medicinal and in guiding its clinical applications.

[Definition of ascending and descending, floating and sinking]
Ascending and floating refer to the upward and outward movement of medicinal action, while descending and sinking mean the downward and inward flow of medicinal action. Pathologically, the disease may lodge in the superior, inferior, exterior, or interior part of the body; and may develop inward or outward. Therefore, medicinals that tend to ascend, descend, float, or sink should be prescribed in line with affected area and pathogenesis, as echoed by “treat adverse rising by inhibition, treat fallen by raising” in The Yellow Emperor’s Inner Classic (黄帝内经, Huáng Dì Nèi Jīng).

Ascending medicinals, capable of raising and lifting, are mainly used for sinking patterns. Huáng Qí (Radix Astragali, Astragalus Root), and Shēng Má (Rhizoma Cimicifugae, Black Cohosh Rhizome), for instance, both can raise qi in the middle jiao and are therefore applicable for gastroptosis, hysteroptosis, and proctoptosis due to enduring diarrhea.

Descending medicinals, capable of downbearing and suppressing, are mainly used for disorders due to ascending counterflow of qi, and pathogenic fire flaming upward. For instance, Dài Zhě Shí (Hematitum, Hematite) is effective in descending adverse flow of stomach qi and lung qi and therefore considered suitable for vomiting and panting, and Lóng Dân Cáo (Radix et Rhizoma Gentianae, Chinese Gentian) is potent in subduing liver fire and hereby appropriate for diseases caused by fire-heat of the liver and gallbladder flaming upward.

Floating medicinals, capable of ascending upward and dispersing, are mainly used for diseases located exteriorly and superiorly in the body. For instance, Bò He (Herba Menthae, Field Mint) and Chán Tuì (Periostracum
Cicadae, Cicada Moulting) both are floating and dispersing in nature and thus applicable for cases of exterior pattern and pathogenic changes in the head or face.

Sinking medicinals, capable of downbearing and promoting defecation and urination, are mainly used for diseases affected the interior or lower part of the body. For instance, Dà Huáng (Radix et Rhizoma Rhei, Rhubarb Root and Rhizome) that promotes defecation and Mù Tōng (Caulis Akebiae, Akebia Stem) that disinhibits urination are both sinking in nature.

All in all, each medicinal has a functional tendency to either rise, fall, float, or sink, which is also indicative of the clinical situation in which it can be effectively used. These trends of medicinal actions and their clinical applications are complementary and supplementary to each other. It is worth to note that a few medicinal substances have shown a tendency to both float and rise, or both sink and descend. Jú Huā (Flos Chrysanthemi, Chrysanthemum Flower), for instance, scatters and dissipates wind-heat exteriorly, and also clears and subdues liver fire interiorly; and Fú Píng (Herba Spirodelae, Duckweed) induces sweating to release the exterior pathogen and meanwhile disinhibits internal water retention to relieve edema.

[Influential factors on ascending, descending, floating, and sinking]
Many factors influence the ascending, descending, floating, and sinking of medicinals. The primary cause is medicinal property such as qi, flavor, and texture. Generally, medicinals that are pungent and sweet in flavor and warm and heat in nature tend to ascend and float; while those that are bitter, sour, and salty in flavor and cold and cool in nature are prone to descend and sink. Medicinals originating from flowers, leaves or lightweight substances are primarily ascending and floating; the ones from seed and heavyweight substances like mineral and shell are mostly descending and sinking. However, there are some exceptions, for instance, Xuán Fù Huā (Flos Inulae, Inula Flower) and Yuán Huā (Flos Genkwa, Lilac Daphne Flower Bud) both are from flowers, but the former descends and sinks, and the latter drains downward; Niú Bàng Zī (Fructus Arctii, great burdock achene), originated from seed, acts to scatter and dissipate by ascending and floating.
Additionally, the functional tendency of medicinal is found associated with its processing and combination. For instance, medicinals treated with ginger, vinegar, and wine have shown dispersing, astringing, and ascending-floating property, respectively. Suppression occurs when a medicinal that tends to float and rise is combined with a group of sinking and descending substances, and vice versa.

**Channel tropism**

Another branch of medicinal property theory is channel tropism. Based on *zang-fu* theory and channel and collateral doctrine, it is an attempt to sum up the actions of medicinals and describe the selective therapeutic effects of a medicinal on a certain part of the body. In *Science of Chinese Materia Medica*, an herb is said to have specific actions because of the *zang-fu* organ and channel it enters. For instance, medicinals that clear heat can be subdivided by targeted organs into stomach-heat clearing, gallbladder-heat draining, lung-heat relieving, and large intestines-heat removing category; and among the tonics, some strengthen the lung, some reinforce the spleen, while others may supplement the liver or kidney. To understand this theory comprehensively, learners should know *zang-fu* theory and channel and collateral theory, especially the running routes of channels and collaterals. For instance, some medicinals that relieve chest and rib-side pain are inferred with liver and gallbladder channel tropism because these two channels run through the above-mentioned areas. The theory of channel tropism is summed up through clinical outcomes. Therefore, only when attention is paid to the different aspects of medicinals such as actions and indications, can its channel tropism be comprehended.

Each of the above discussed theories tries to explain the properties and actions of medicinals from different aspects. Among them, the theory of four qi and five flavors is the core and also the key concepts for students. The theories of the four qi and five flavors, and actions of lifting, lowering, floating and sinking of herbs, and channel tropism, should be associated with each other to be comprehensively analyzed and thoroughly understood.
**Daily practice**

1. What is the meaning of ascending, descending, floating and sinking? What are their influential factors?
2. What are the relationships between four qi and five flavors and actions of ascending, descending, floating, and sinking?
3. What is the essence of channel tropism of a medicinal?

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**III. Influencing Factors of Chinese Medicinal Therapeutic Effects**

Chinese medicinals have been used as major tools in traditional Chinese medicine to treat disorders, and doctors and patients and their family members share a common concern about therapeutic effects. Clinically, formulas and medicinals that are appropriately prescribed can sometimes fail to produce optimal outcomes, or medicinals provided by different pharmacies may have different therapeutic effects. Therefore, it is necessary to know the factors that influence the therapeutic effects of Chinese medicinal.

**Quality of Chinese medicinal**

Doctors and patients are both greatly concerned about the quality of Chinese medicinal, and it will be helpful if they know how to identify. Quality is undoubtedly the primary factor affecting therapeutic effects, the scales and grades that identified and licensed by Department of Commerce is considered the major standard for quality evaluation.

[Specification of Chinese Materia Medical] The specifications of medicines are categorized in the following ways:

1. Clarity and methods of processing
   Take Shān Yào (Rhizoma Dioscoreae, Common Yam Rhizome) as an example, those with skin are known as 毛山药, Máo Shān Yào, whereas those without peel and prepared into round shapes are known
as 光山药 Guāng Shān Yào. Other examples include Máo Xiāng Fù
(Nutgrass Galangale Rhizome with root hair) and Guāng Xiāng Fù
(Nutgrass Galangale Rhizome without root hair), Yuān Zhī Tōng (Thin-
leaf Milkwort Root without core) and Yuān Zhī Ròu (fleshy Thin-leaf
Milkwort Root), and Shēng Shāi Shēn (Radix et Rhizoma Ginseng
Cruda, Sun-dried Ginseng) and Hóng Shēn (Radix et Rhizoma Ginseng
Rubra, Red Ginseng).

2. Harvest time
Take Sān Qī (Radix et Rhizoma Notoginseng, Pseudoginseng Root) as
an example; 春七 Chūn Qī that harvested before blooming in spring are
full-grown and with better quality, while 冬七 Dōng Qī that collected
after seed setting in autumn and winter are of loose texture and poor
quality. Another example is Tiān Má (Rhizoma Gastrodiae, Tall
Gastrodis Tuber), 春麻 Chūn Má that harvested upon sprouting in sum-
mer are lightweight with a hollow-centered cross section and poor
quality, while 冬麻 Dōng Má that harvested in autumn are solid and
heavyweight with better quality.

3. Growth period
Lián Qiào (Fructus Forsythiae, Weeping Forsythia Capsule) is catego-
rized by the maturity of the fruit into 黄连翘 Huáng (yellow) Lián Qiào
and 青连翘 Qīng (green) Lián Qiào. Another example is Bò He (Herba
Menthae, Field Mint), the first harvested is known as 头刀薄荷 Tóu
Dāo Bò He, and the second is 二刀薄荷 Èr Dāo Bò He, has the content
of peppermint essential oil is most plentiful in pre-bud period, and the
greatest percentage of menthol crystal is yielded in full flowering stage.

4. Production area
Bái Sháo (Radix Paeoniae Alba, White Peony Root) produced in
Zhejiang, Anhui, and Sichuan is known as 杭白芍 Háng Bái Sháo,
亳白芍 bó Bái Sháo, and 川白芍 Chuān Bái Sháo, respectively. Hòu
Pò (Cortex Magnoliae Officinalis, Magnolia Bark) from Sichuan and
Wenzhou of Zhejiang are named as 川朴 Chuān Pò and 温朴 Wēn Pò,
respectively.

5. Medicinal parts and morphology
Different parts from the same Chinese materia medica can be used as
medicinal; however, their actions are different or even opposite. Take Má
Huáng (Herba Ephedrae, Eph Edra) as an example, its stem and leaf
induce sweating, whereas its root arrests sweating. For Dāng Guī (Radix Angelicae Sinensis, Chinese Angelica), different functions are ascribed to归头 Guī Tōu (the head-uppermost part), Guī Weī (the tail part deepest in the soil), 归身 Guī Shēn (the body part in-between), and Quán Dāng Guī全当归 (the whole medical plant). The head is considered most potent in invigorating blood and the body is for harmonizing blood.

[Grading of Chinese materia medica] Medicinals with the same specification or name are divided by quality into grade A, B, C, D, and so forth, where grade A is for the best. All of the rankings undergo specific ranking criteria, take Sān Qī (Radix et Rhizoma Notoginseng, Pseudoginseng Root) as an example; grade A refers to less than 20 pieces with an aggregate weight of 500g, and grade B refers to less than 30 pieces with an aggregate weight of 500g.

Gradeless goods (统货, Tŏng Huò) refers to the Chinese medicinals that have no specifications and grades, as there is no big difference in their quality. These medicinals include Yī Mū Căo (Herba Leonuri, Motherwort Herb), Pí Pá Yè (Folium Eriobotryae, Loquat Leaf), and Băi Zĭ Rén (Semen Platycladi, Oriental Arborvitael).

Specifications and grades can to some extent reflect the quality and appearance of medicinal, but the appearance quality is not always in line with the inner quality. For instance, the primary criterion for selecting Rēn Shēn (Radix et Rhizoma Ginseng, Ginseng) is the thick root in terms of appearance quality, however, the clinical efficacy of the thinner root is as good as that of the thicker.

Production area and harvesting of Chinese materia medica

Dated back to ancient China, people already realized that medicinals produced in different areas have different quality. Each medicinal needs a certain amount of sunlight, proper climate, and moisture optimal soil conditions, the highest quality herbs with best therapeutic effects come from the most suitable areas and are known as genuine regional medicinals (地道药材, Dì Dào Yào Cái). This has been proven by both clinical practice and modern experiments. Owing to differences in climate, soils, and water quality in production areas, there are certain differences in the content of active ingredients and ratio of the components.
The well-known genuine regional medicinals include Huáng Lián (Rhizoma Coptidis, Coptis Rhizome), Fù Zǐ (Radix Aconiti Lateralis Praeparata, Monkshood), Bèi Mǔ (Bulbus Fritillariae, Fritillary Bulb), and Chūn Xiāng (Rhizoma Chuanxiong, Sichuan Lovage Root) from Sichuan; Sān Qī (Radix et Rhizoma Notoginseng, Pseudoginseng Root) from Yunnan; Dāng Guī (Radix Angelicae Sinensis, Chinese Angelica) and Gōu Qī Zī (Fructus Lycii, Chinese Wolfberry Fruit) from Gansu; Gān Cāo (Radix et Rhizoma Glycyrrhizae, Licorice Root) from Inner Mongolia; Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) from Jilin; Huáng Qī (Radix Astragali, Astragalus Root) and Dāng Shēn (Radix Codonopsis, Codonopsis Root) from Shanxi; Dì Huáng (Radix Rehmanniae, Rehmannia), Shān Yāo (Rhizoma Dioscoreae, Common Yam Rhizome), and Nǐ Xī (Radix Achyranthis Bidentatae, Two-toothed Achyranthes Root) from Henan; Mǔ Dān Pí (Cortex Moutan, Tree Peony Bark) and Mù Gūa (Fructus Chaenomelis, Chinese Quince Fruit) from Anhui; Zhè Bèi Mǔ (Bulbus Fritillariae Thunbergii, Thunberg Fritillary Bulb), Xuān Shēn (Radix Scrophulariae, Figwort Root), and Yán Hú Suǒ (Rhizoma Corydalis, Corydalis Rhizome) from Zhejiang; Zé Xiè (Rhizoma Alismatis, Water Plantain Rhizome) from Fujian; Huò Xiāng (Herba Agastachis, Agastache), Chén Pí (Pericarpium Citri Reticulatae, Aged Tangerine Peel) from Guangdong; Gē Jiè (Gecko, Gecko) and Ròu Guì (Cortex Cinnamomi, Cinnamon Bark) from Guangxi; Zhī Shǐ (Fructus Aurantii Immaturus, Immature Bitter Orange) from Jiangxi; and Bò He (Herba Menthae, Field Mint), Xià Kū Cāo (Spica Prunellae, Common Self-heal Fruit-spike), Tài Zǐ Shēn (Radix Pseudostellariae, Heterophylly False Satarwort Root), and Cāng Zhú (Rhizoma Atractylodis, Atractylodes Rhizome) from Jiangsu.

Genuine regional medicinals are preferable in the clinic and the source of the herb is often incorporated into its name, such as Guāng Mù Xiāng (Radix Aucklandiae, Saussuriae Root), Chuān Bèi Mǔ (Bulbus Fritillariae Cirrhosae, Sichuan fritillaria bulb), and Lù Dāng Shēn (Radix Codonopsis from Lu’an, Lu’an Codonopsis). Demand for Chinese medicinals has increased both domestically and abroad, therefore more efforts should be paid to develop genuine regional medicinals, and on the other hand the introduction and domestication should be carried out. Some introduced species have been cultivated successfully in China, and their quality are as
good as genuine regional ones, such as Mù Xiāng (Radix Aucklandiae, Common Aucklandia Root), Ròu Dòu Kòu (Semen Myristicae, Nutmeg), Mā Qián Zī (Semen Strychni, Nux Vomica Seed), Dīng Xiāng (Flos Caryophylli, Clove Flower), Ròu Guì (Cortex Cinnamomi Cinnamon Bark), and Xī Yáng Shēn (Radix Panacis Quinquefolii, American ginseng).

[Harvesting of Chinese materia medica] The quality of medicinal is closely related to the season, time, and method of collection. Take harvest season for an example, the content of alkaloid in Cāo Má Huáng (Herba Ephedrae, Ephedra) is extremely low in spring, increases dramatically in summer, reaches its peak in August and September, and then decreases significantly; active ingredients of Fān Xì Yè (Folium Sennae, Senna Leaf) are most plentiful on 90th day; and Yáng Jìn Huā (Flos Daturae, Datura Flower) should be harvested from 10 a.m. to 2 p.m. as its total alkaloid content is richest when blossoms are falling. Herbs should be collected at the time when their active ingredients are most plentiful, specifically, the entire plant, stems, branches, and leaves usually in the period when stems and leaves are blooming or blossoming, except for some leaves that are harvested in autumn (such as Sāng Yè (Folium Mori, Mulberry Leaf) and Pí Pá Yè (Folium Eriobotryae, Loquat Leaf)); root or rhizome just before sprouting in early spring or in late fall when aerial part is withered, except for some roots that are harvested in summer when their stems and leaves wither (such as Tài Zī Shēn (Radix Pseudostellariae, Heterophylly False Satarwort Root), Yán Hú Suō (Rhizoma Corydalis, Corydalis Rhizome), and Bàn Xià (Rhizoma Pinelliae, Pinellia Rhizome); the bark in late summer or early autumn when sap is most plentiful and it is most peelable; flowers before opening or just opening when the petals are intact and fragrance is easy to preserve; and fruits and seeds upon ripening, except for some that are harvested when immature (such as Wū Méi (Fructus Mume, Smoked Plum), Qīng Pí (Pericarpium Citri Reticulatae Viride, Green Tangerine Peel), and Zhī Shí (Fructus Aurantii Immaturus, Immature Bitter Orange)). When insect species are used for medicinal purposes, the physician should know their hatching, growth, and development season: the whole body usually in the most active period; flying insects in early morning (before the dew dries out); and ootheca before hatching (steaming the ova until dead).
**Processing of Chinese materia medica**

Processing of Chinese materia medica is to adapt it to the needs of a particular medical care, prescription, preparation, and storage under the guidance of theories of traditional Chinese medicine. It is also known as an important characteristic of Chinese materia medica, can directly influence the therapeutic effects and therefore is helpful to know some general knowledge.

[Purpose of processing] The medicinal is processed for the following purposes:

1. To reduce or eliminate side-effects.
   Some medicinals have toxicity or cause side-effects. For example, ingesting untreated Rŭ Xiăng (Olibanum, Frankincense) and Mò Yào (Myrrha, Myrrh) may easily cause nausea and vomiting, but stir-frying eliminates their tendency.

2. To alter a medicinal properties for a particular clinical condition.
   For instance, Shēng Dì Huáng (Radix Rehmanniae, Rehmannia) is cool in nature and used for clearing blood, after processing it becomes Shú Dì Huáng (Radix Rehmanniae Praeparata, Prepared Rehmannia Root), which is warming in nature and used as a tonic. Another example is Shēng Hé Shŏu Wū (Radix Polygoni Multiflori, Fleece Flower Root), which is used for moistening the intestines to promote defecation, after processing it becomes Zhì Hé Shŏu Wū (Radix Polygoni Multiflori Praeparata cum Succo Glycines Sotae, Prepared Fleeceflower Root) that is usually used to nourish the liver and kidney.

3. To improve therapeutic effects: For example, using vinegar to process Yán Hú Suó (Rhizoma Corydalis, Corydalis Rhizome) can increase its potency of relieving pain, and charred Dì Yú (Radix Sanguisorbae, Garden Burnet Root) is considered more effective in stopping bleeding.

Additionally, processing can make medicinals clean and render them more suitable for preparation and storage.

[Methods of Processing] Many processing methods and general knowledge are available in our sources.
Generally, processing methods of Chinese medicinals are categorized into 修治 Xiū Zhì and 炮炙 Páo Zhì. The former refers to removing ashes, soils, impurities, and non-medicinal portions of a substance, soaking and rinsing in water, cutting into segments, slices, and slivers, or grinding into powder; while the latter refers to stir-frying, frying with liquid, quick-frying, calcining, roasting in ashes, steaming, boiling, frosting (removing seed-oil by pressing and making the residue into frostlike powder), fermenting, and sprouting.

Clinically, the processing of medicinal is conducted to the needs of treatment, and the method adopted is often included into its name. For instance, 姜半夏 Jiāng Bàn Xià refers to the Bàn Xià (Rhizoma Pinelliae Praeparatum, Pinellia Rhizome) processed with ginger juice (姜, Jiāng), 胆南星 Dăn Nán Xīng (Arisaema cum Bile, Bile Arisaema) indicates the substance has been treated with bile of pig or cow (胆, Dăn), and Cù Chái Hú (vinegar-fried thotowax root) refers to the Chái Hú (Radix Bupleuri, Bupleurum) prepared by vinegar (醋, Cù). Processing is a special technique that has many operational methods and been expounded by monographs. This book provides you with the preliminary knowledge.

**Daily practice**

1. How to identify the quality of Chinese materia medica?
2. What is the genuine regional medicinal? Could you please explain the relationship between harvesting and quality with examples of medicinals?
3. What are the purposes and major methods of processing?

**Usage of Chinese materia medica**

Appropriate usage is another important factor that influences the therapeutic response. Generally, it includes oral administration (usually prepared into decoction, pill, powder, decocted extract, and medicinal wine) and external application (including moxa-compression, medicinal bath,
laryngeal insufflation, eye dropping, warm medicated compression, and suppository). Proper usage is determined based on a particular clinical condition and the need of treatment. However, some medicinals should not be used in decoction, such as Gān Suì (Radix Kansui, gansui root) containing water-insoluble active ingredients and Shè Xiāng (Moschus, Musk) and Bīng Piàn (Borneolum Syntheticum, Borneol) containing aromatic compounds that are easily volatilized after being heated.

Generally, decoction is considered most appropriate for acute disorders, and pills and powders are used primarily for chronic diseases. Therefore, there is a saying in traditional Chinese medicine that “decoction takes effect quickly and drastically, while pills slowly and moderately”. There are a few details that should be noted when taking medicinals.

[Decocting methods] Decoction (Tāng) is by far the most common way by which Chinese medicinal is taken. Correct method of decocting can improve therapeutic effects.

Earthenware pots are preferred, and porcelain utensil is acceptable when the former is not available, but the cooking utensil made of aluminium and iron should not be used as the interaction between these metals and medicinals may influence the therapeutic effects.

Medicinals should be soaked in cold water for 30 minutes before decocting, the liquid should at most cover the herbs in the cooking utensil. Usually, one dose should be decocted for two times, three times if it is a tonic, 250–300 ml medicinal juice each time.

Flame in cooking medicinals may either be strong fire (武火, Màn Huǒ) or slow fire (文火, Wén Huǒ), the former is fierce with high heat, while the latter is gentle with low heat. Usually when there are exterior-releasing or aromatic medicinals in the decoction, it is first brought to a boil using strong fire and then cooked over slow fire for several minutes to avoid the loss of volatile active ingredients. Tonics are cooked over slow fire for long periods to get the full effect of active ingredients.

Hard minerals and shells demand prolonged cooking to facilitate active ingredient extraction, such as Shí Gāo (Gypsum Fibrosum, Gypsum), Chí Shí (Magnetitum, Magnetite), Mǔ Lì (Concha Ostreae, Oyster Shell), and Lóng Gū (Fossilia Ossis Mastodi, dragon bones). They are boiled first
for over 10 minutes before other medicinals are added to the decoction. This method, known as decocting first “先煎, Xiān Jiān”, is also applied in cooking certain toxic herbs to reduce its toxicity.

It is easy for medicinals such as Bò He (Herba Menthae, Field Mint), Shā Rén (Fructus Amomi, Villous Amomum Fruit), and Bái Dòu Kòu (Fructus Amomi Kravanh, Round Cardamon) to lose their active ingredients during the course of prolonged decocting. They should be added to a decoction only a few minutes before the cooking is finished; this method is known as add near end “后下, Hòu Xià”.

Tiny, powdery, and hairy medicinals are usually decocted in gauze as they float on the surface of decoction or make the the liquid sticky or irritate the throat. This method is noted as decocted in gauze “包煎, Bāo Jiān” in doctor’s prescription.

Extremely expensive medicinals such as Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) and Lù Róng (Cornu Cervi Pantotrichum, Deer Velvet) are often simmered separately in a double boiler (known as 另炖, Lìng Dùn) or cooked individually (known as 另煎, Lìng Jiān) for a long period of time to get the full effect of active ingredients and avoid loss of efficacy caused by decocting together with other medicinals. Some gelatine substances such as Ē Jiāo (Colla Corii Asini, Donkey-hide Gelatin) should be separately steamed in a small bowl until melted and the resulting solution added to the strained decoction of other ingredients before ingestion, or directly added into the strained decoction of other ingredients and melted by stirring. This method, known as melting (烊化, Yáng Huà), prevents such medicinals from sticking to the pot or other medicinals.

[Methods of taking medicine] Appropriate precautions should be taken for oral administration of Chinese medicinals in different forms. For instance, a decoction should be taken as one dose and twice a day; two doses and once every 4–6 hours in emergent and severe cases. Tonics should be taken before meals; irritants to the stomach should be taken after meals; mind-calming medicinals should be taken before sleep; worm-expelling substances should be taken on an empty stomach; malaria-relieving herbs should be taken two hours before the onset. Ignorance of the above-mentioned precautions may cause decreased clinical outcomes.
Storage of Chinese materia medica

Chinese materia medica is featured by extensive sources, various species, large amount, complicated properties and actions, and differences in active constituent. During the storage, various external factors may impact the quality of medicinals and eventually affect their therapeutic effects. Some general guidelines of the storage are necessary for practitioners to identify the quality of Chinese materia medica.

[Deterioration of Chinese materia medica] The common deterioration phenomena of Chinese materia medica during storage are as follows:

1. Damage caused by worms: worms can settle in the medicinal, resulting in deterioration phenomena such as fleck, holes or even powdery texture. It will reduce the medicinal value to different degrees, and neutralize the effect or generate toxicity in severe cases.
2. Mildew damage: mildew will grow on or inside any medicinal surface, as long as it has moisture. It will cause decomposition and deterioration of the medicinals, reducing or depriving their positive effects, even generating toxins and being a health hazard. A common example is the toxin generated by aspergillus flavus.
3. Color change: it is related with damage caused by worms, mildew damage, solarization, and long-term storage of the medicinal. It will result in deterioration and invalidity.
4. Oil leakage: it, also known as extensive diffusion of oil, is a deterioration phenomenon that caused by the spilling over of oil ingredients of oily medicinals, or leakage of oil-like substances from sugar or mucilage-containing medicinals.

Other types of deterioration include volatilization and vapidity of the aromatic medicinal, fusion, efflorescence, deliquescence, and decomposition.

[Method of Storing Chinese materia medica] The storage of Chinese medicinal is a complex subject that depends on many factors, professional knowledge, specific techniques, and methods. Still, doctors or patients should know the general storing methods of Chinese medicinals. For medicinals that easily to be damaged by worms, they should be dried by
solarization or baking before storage; or method of killing insects by low temperature and isolation. In addition, medicinals with special components or fragrance have been traditionally used to kill or expel worms and prevent other medicinals from damage caused by worms. Two examples are storing Huā Jiāo (Pericarpium Zanthoxyli, Pricklyash Peel), Xī Xīn (Radix et Rhizoma Asari, Manchurian Wild Ginger), and Zhān Nào (Camphora, Camphor) with animal species used for medicinal purpose or medicinals most likely to be damaged by worms; or putting 70% ethanol at the bottom of the container, and tightly covering it to protect against worms and inhibit bacteria. Another preferred worm-resisting approach is to keep certain medicinals together, a common example is storing Mǔ Dān Pí (Cortex Moutan, Tree Peony Bark) with Zé Xiè (Rhizoma Alismatis, Water Plantain Rhizome), and Chén Pí (Pericarpium Citri Reticulatae, Tangerine Pericarp) with Gāo Liáng Jiāng (Rhizoma Alpiniae Officinarum, Galangal) to improve their resistance to worms and maintain their original color, luster, and aroma. Medicinals susceptible to mildew need sun exposure in a timely manner, temperature regulation, and good ventilation.

Medicinals prone to color change and smell and taste loss should be stored away from high temperatures but in a less-ventilated area. Medicinals susceptible to discoloration upon sun exposure should be stored away from direct sunlight. Easily deliquescent and efflorescent medicinals need to be kept in a sealed container. Small amounts of medicinal stored at home should be kept in a cool and shady place for no more than six month. Precious and expensive medicinals, such as Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) and Lù Róng (Cornu Cervi Pantotrichum, Deer Velvet), should be completely dried and then kept well sealed; or stored with scorched fried rice in a sealed container; and Shè Xiāng (Moschus, Musk) and Niú Huáng (Calculus Bovis, Cow Bezoar) should be wrapped in oiled paper, stored in sealed containers, and then kept away from light and high temperatures. Chinese patent medicine should be stored beyond the expiration date on the package.

IV. Combination and its Contraindication of Chinese Materia Medica

When applying Chinese materia medica, practitioners are supposed to know the natures, flavors, actions, indications, contraindications of every
medicinal and precautions of certain toxic medicinals. When organizing a prescription, the principle of combining medicinal substances should be followed. These aspects are closely related with the therapeutic effects.

**Combination of Chinese materia medica**

Combination is an art that uses two or more medicinals together for clinical purpose and is based on the action of the ingredients employed. It is one of the essential characteristics of traditional Chinese medication, the primary form of clinical medication, and also the basis of the organization of prescription. Combination of medicinals reflects the experience accumulated by numerous practitioners over the ages, and the concrete treatment method based upon the theories of traditional Chinese medicine. Only when the principles of combining medicinals became familiar to the practitioners can they become proficiently in treating various diseases with Chinese materia medica.

[Effects of combination of medicinals] Medicinals have been combined to

1. Accommodate complicated clinical conditions
   In the clinic, simple case can be cured with a single medicinal, however there are many complex cases that need to be treated with the combination of medicinals, such as diseases involving both the exterior and interior, diseases involving several zang organs, disorders affecting both the upper and lower part of the body, deficiency-excess complex, or cold-heat complex.

2. Increase therapeutic effectiveness
   Combination of several medicinals with similar actions can accentuate their therapeutic functions. Sometimes, for a certain disease or pattern, combination of two or more medicinals with different actions can improve their clinical outcomes as the ingredients employed act on different aspects.

3. Reduce the toxicity and side effects
   Some medicinals generate toxic and side effects while treating disease. If that is the case, it is necessary to combine some medicinals that counteract these undesirable effects.
[Categories of combination of medicinals] Traditionally the seven relations of medicinal compatibility (七情, Qī Qíng) were first mentioned in *Shen Nong’s Classic of the Materia Medica* (神农本草经, Shén Nóng Běn Cǎo Jīng), namely use of a single medicinal (单行, Dān Xíng), mutual reinforcement (相须, Xiāng Xū), mutual assistance (相使, Xiāng Shǐ), mutual restraint (相畏, Xiāng Wèi), mutual inhibition (相杀, Xiāng Shā), mutual antagonism (相恶, Xiāng Wù), and mutual incompatibility (相反, Xiāng Fǎn). Mutual reinforcement (相须, Xiāng Xū) refers to the combination of medicinals with similar actions to generate synergistic effect and improve therapeutic effectiveness. Two examples are combining Huáng Lián (Rhizoma Coptidis, Coptis Rhizome), Huáng Qín (Radix Astragali, Milk-vetch Root), and Huáng Băi (Cortex Phellodendri Chinensis, Amur Cork-tree Bark) to improve their potency of clearing heat and relieving toxin; and combining Jīng Jiè (Herba Schizonepetae, Schizonepeta) and Fáng Fēng (Radix Saposhnikoviae, Ledebouriella Root) to highlight their actions of dispelling exterior cold pathogen; mutual assistance (相使, Xiāng Shǐ) means the combination of medicinals with different actions in which one substance enhances the effect of the principal ingredients to enhance therapeutic effectiveness. Examples are combining qi-tonifying Huáng Qí (Radix Astragali, Astragalus Root) and exterior-dispersing Fáng Fēng (Radix Saposhnikoviae, Siler) to improve the former’s ability of consolidating the exterior; or heat-clearing Shí Gāo (Gypsum Fibrosum, Gypsum) and downward-running Niú Xī (Radix Achyranthis Bidentatae, Two-toothed Achyranthes Root) to direct stomach-fire downward; mutual restraint (相畏, Xiāng Wèi) refers to a combination in which the toxicity or side effects of one medicinal are reduced or eliminated by another medicinal. Traditional examples are that the toxicity of Dīng Xiāng (Flos Caryophylli, Clove Flower) is reduced by Yù Jīn (Radix Curcumaee, Turmeric Root Tuber); and the toxicity of Bàn Xià (Rhizoma Pinelliae, Pinellia Rhizome) and Dàn Nán Xīng (Arisaema cum Bile, Bile Arisaema) are alleviated by Shēng Jiāng (Rhizoma Zingiberis Recens, Fresh Ginger); mutual inhibition (相杀, Xiāng Shā) is the converse of mutual restraint in that here one medicinal also reduces or eliminates the toxicity or side effects of
another; mutual antagonism (相恶, Xiāng Wù) means the ability of two medicinals to minimize or neutralize each other's original effects. A common example is that Lái Fú Zǐ (Semen Raphani, Radish Seed) antagonizes Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) and weakens the latter's effect; and mutual incompatibility (相反, Xiāng Fān) occurs when the combination of two medicinals gives rise to toxicity or side effects. Traditional example is that Gān Cǎo (Radix et Rhizoma Glycyrrhizae, Licorice Root) is incompatible with Gān Sùi (Radix Kansui, Gansui Root).

[Prohibited combination] In ancient Chinese materia medica works, there are many records about prohibited combination like mutual antagonism (相恶, Xiāng Wù) and mutual incompatibility (相反, Xiāng Fān) mentioned above. Meanwhile, two sets of prohibited combinations known as nineteen antagonisms (十九畏, Shí Jiǔ Wèi) and eighteen incompatibilities (十八反, Shí Bā Fān) gained the widest recognition. Nineteen antagonisms (十九畏, Shí Jiǔ Wèi) means a combination in which one medicinal minimize the positive effect of another, such as Liú Huáng (Sulphur, Sulphur) antagonizes Pò Xiāo (Mirabilitum, Mirabilite), Shuĭ Yín (Hydrargyrum, Mercury) antagonizes Pī Shuāng (Arsenic Trioxide), Láng Dú (Radix Euphorbiae Fischerianae, Wolf's Bane) antagonizes Mī Tuó Sēng (Lithargyrum, Galena), Bā Dòu (Fructus Crotonis, Croton Seed) antagonizes Qiān Niú Zǐ (Semen Pharbitidis, pharbitidis seed), Dīng Xiāng (Flos Caryophylli, Clove Flower) antagonizes Yù Jīn (Radix Curcumae, Turmeric Root Tuber), Yá Xiāo (Crystalline Sodium Sulfate) antagonizes Sān Léng (Rhizoma Sparganii, Common Burr Reed Tuber), Chuān Wū (Radix Aconiti, Common Monkshood Mother Root) and Cǎo Wū (Radix Aconiti Kusnezoffii, Kusnezoff Monkshood Root) antagonizes Xī Jiāo (Cornu Rhinocerotis, Rhinoceros Horn), Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) antagonizes Wū Líng Zhī (Feces Trogopterori, Flying Squirrel Feces), and Guān Guì (Cortex Cinnamomi, Cinnamon Bark) antagonizes Chī Shí Zhī (Halloysitum Rubrum, Halloysite). Eighteen incompatibilities (十八反, Shí Bā Fān) occurs when the combination of two medicinals generate toxicity or side effects, such as Wū Tōu (Radix Aconiti) is incompatible with Bān Xià (Rhizoma Pinelliae, Pinellia
Rhizome), Guā Lóu (Fructus Trichosanthis, Snakegourd Fruit), Bèi Mǔ (Bulbus Fritillariae, Fritillary Bulb), Bái Liān (Radix Ampelopsis, Ampelopsis), and Bái Jí (Rhizoma Bletillae, Bletilla Rhizome); Gān Cāo (Radix et Rhizoma Glycyrrhizae, Licorice Root) is incompatible with Hǎi Zǎo (Sargassum, Seaweed), Dà Jí (Radix Euphorbiae Pekinesis, Euphorbia Root), Gān Suì (Radix Kansui, Gansui Root), and Yuán Huā (Flos Genkwa, Lilac Daphne Flower Bud); Lí Lú (Radix et Rhizoma Veratri Nigri, Veratrum Root and Rhizome) is incompatible with Rén Shēn (Radix et Rhizoma Ginseng, Ginseng), Shā Shēn (Radix Adenophorae seu Glehniae), Dān Shēn (Radix et Rhizoma Salviae Miltiorrhizae, Danshen Root), Xuán Shēn (Radix Scrophulariae, Figwort root), Kū Shēn (Radix Sophorae Flavescentis, Light Yellow Sophora Root), Xī Xīn (Radix et Rhizoma Asari, Manchurian Wild Ginger), and Sháo Yào (Radix Paeoniae, peony root). The understanding of above-mentioned “antagonisms” and “incompatibilities” has been under dispute over the ages, and there are many ancient formulas that those incompatible or antagonistic medicinals are prescribed together. Modern researches have no exact conclusions yet, however, they should be used with more cautions.

[Addendum] Eighteen incompatibilities (十八反, Shí Bā Fǎn), so called because they are composed of three set with a total of eighteen incompatible substances:

Wǔ Tóu (Radix Aconiti) is incompatible with:
- Bàn Xià (Rhizoma Pinelliae, Pinellia Rhizome)
- Guā Lóu (Fructus Trichosanthis, Snakegourd Fruit)
- Bèi Mǔ (Bulbus Fritillariae, Fritillary Bulb)
- Bái Liān (Radix Ampelopsis, Ampelopsis)
- Bái Jí (Rhizoma Bletillae, Bletilla Rhizome);

Gān Cāo (Radix et Rhizoma Glycyrrhizae, Licorice Root) is incompatible with:
- Hǎi Zǎo (Sargassum, Seaweed)
- Dà Jí (Radix Euphorbiae Pekinesis, Euphorbia Root)
- Gān Suì (Radix Kansui, Gansui Root)
- Yuán Huā (Flos Genkwa, Lilac Daphne Flower Bud);
Lí Lú (Radix et Rhizoma Veratri Nigri, Veratrum Root and Rhizome) is incompatible with:
- Rén Shēn (Radix et Rhizoma Ginseng, Ginseng)
- Shā Shēn (Radix Adenophorae seu Glehniae)
- Dān Shēn (Radix et Rhizoma Salviae Miltiorrhizae, Danshen Root)
- Xuán Shēn (Radix Scrophulariae, Figwort root)
- Kū Shēn (Radix Sophorae Flavescentis, Light Yellow Sophora Root)
- Xì Xīn (Radix et Rhizoma Asari, Manchurian Wild Ginger)
- Sháo Yào (Radix Paeoniae, peony root).

Nineteen antagonisms (十九畏, Shí Jiù Wèi)
- Liú Huáng (Sulphur, Sulphur) antagonizes Pò Xiāo (Mirabilitum, Mirabilite)
- Shuǐ Yín (Hydrargyrum, Mercury) antagonizes Pī Shuāng (Arsenic Trioxide)
- Láng Dú (Radix Euphorbiae Fischerianae, Wolf’s Bane) antagonizes Mì Tuó Sēng (Lithargyrum, Galena)
- Bā Dòu (Fructus Crotonis, Croton Seed) antagonizes Qiān Niú Zǐ (Semen Pharbitidis, pharbitidis seed)
- Dīng Xiāng (Flos Caryophylli, Clove Flower) antagonizes Yù Jīn (Radix Curcumae, Turmeric Root Tuber)
- Yá Xiāo (Crystalline Sodium Sulfate) antagonizes Sān Léng (Rhizoma Sparganii, Common Burr Reed Tuber)
- Chuān Wū (Radix Aconiti, Common Monkshood Mother Root) and Cāo Wū (Radix Aconiti Kusnezoffii, Kusnezoff Monkshood Root) antagonizes Xi Jiāo (Cornu Rhinocerotis, Rhinoceros Horn)
- Rén Shēn (Radix et Rhizoma Ginseng, Ginseng) antagonizes Wū Líng Zhī (Feces Trogopterori, Flying Squirrel Feces)
- Guān Guì (Cortex Cinnamomi, Cinnamon Bark) antagonizes Chì Shí Zhī (Halloysitum Rubrum, Halloysite)

**Daily practice**

1. What precautions should be taken when decocting Chinese materia medica?
2. What are the main deterioration phenomena of Chinese materia medica, what precautions should be taken for storage?

3. What are the actions and categories of Chinese materia medica combination?

**Prevention of adverse reactions of Chinese materia medica**

Chinese medicinals are in general safe to use with few side effects, however, they may cause negative results if applied inappropriately. Therefore, comprehensive understanding of their contraindications is necessary to prevent those adverse reactions.

[Knowing the properties of Chinese materia medica] Chinese materia medica can treat diseases but also create undesirable effects. Cold or cool agents, for instance, can clear heat but also injure yang qi; hot or warm ingredients can dispel cold but also exhaust yin fluids; tonics can assist healthy qi but also retain pathogens or hinder digestion if applied inappropriately; and pathogen-dispersing medicinals are necessary approaches for treatment but prone to damage healthy qi. In addition, wrong patterns of differentiation can lead to improper administration of medication with negative therapeutic effectiveness. Huáng Lián (Rhizoma Coptidis, Coptis Rhizome), for instance, owing to its bitter flavor and cold nature, is considered suitable for damp-heat dysentery, and may injure spleen qi and exacerbate the disorder when misused for diarrhea due to spleen deficiency. These known adverse reactions are avoidable only when physicians know the properties including both advantages and disadvantages of Chinese medicinal well.

[Using toxic Chinese materia medica with cautions] Some Chinese materia medica have different levels of toxicity, namely Dà Dú (大毒, strong toxicity) and Xiăo Dú (小毒, mild toxicity). Improper, high doses, or long term use of these poisonous compounds are harmful to the human body. The following precautions for administration are advised:

1. Dosage: the dosage of toxic medicinals, especially strong toxics, must be strictly controlled. Commonly used dosage of these poisonous
ingredients has been elaborated in Chinese materia medica works. They should be started from small dose, and gradually increased until optimum efficacy is achieved. Larger dosage should be based on a particular clinical condition. Precautions should be taken to prevent poisoning due to accumulation of toxicity, even for patients who use small amount for a long period of time. External application of toxic medicinals should be localized (limited to one part of the body) for a short period of time to avoid poisoning due to over-absorption.

2. Strict processing: toxic medicinals should be processed under the strict requirements to eliminate their toxicities. For instance, deep-frying can reduce the toxicity of Mǎ Qián Zǐ (Semen Strychni, Nux Vomica Seed), partially destroying its primary toxic ingredient brucine; preparing Bā Dòu (Fructus Crotonis, Croton Seed) into Bā Dòu Shuāng (Semen Crotonis Pulveratum, Defatted Croton Seed Powder) or Bā Dòu Tàn (Semen Crotonis Carbonisatum, Carbonized Croton Seed) to reduce its toxicity due to drastic purgative.

Usage: different toxic medicinals have different methods of administration, and therefore should be used with more cautions. Some should only be used externally, such as Shēng Yào (Hydrargyrum Oxydatum Crudum, Mercuric Oxide) and Máo Liáng (Ranunculus japonicus Thunb, Buttercup); some should only be used in the form of pill or powder, such as Niú Huáng (Calculus Bovis, Cow Bezoar), Chán Sū (Venenum Bufonis, Toad Venom), and Bān Máo (Mylabris, Cantharide); and others can be used in decoction but should not be prepared into medicated wine, such as Wū Tóu (Radix Aconiti, Common Monkshood Mother Root). Combination of medicinals, as an important approach to prevent or reduce toxic reaction, can help attenuate the toxicity of certain poisonous ingredients, such as combining Fù Zǐ (Radix Aconiti Lateralis Praeparata, Monkshood) with Gān Jiāng (Rhizoma Zingiberis, Dried Ginger Rhizome) and Gān Cāo (Radix et Rhizoma Glycyrrhizae, Licorice Root), and combining Wū Tóu (Aconite Main Tuber) with Fēng Mì (Mel, Honey).

3. Species: the species of Chinese materia medica are complex and diversified. The medicinals with the same name may come from a variety of species, in which some are toxic, some are non-toxic, some are with strong toxicity, and others are of mild toxicity. It is therefore helpful to
know elementary knowledge of medicinal species and make species identification when using these medicinals. Wū Jiā Pí (Cortex Acanthopanacis, Eleutherococcus Root Bark) that dispel wind-damp, for instance, has two species, namely 南五加 Nán Wū Jiā, toxic, is root and bark of Eleutherococcus nodiflorus and 北五加 Wū Jiā Beī, nontoxic, is root and bark of Periploca sepium Bunge, family Asclepiadaceae. Another example is that urination-promoting and strangury-relieving Mù Tōng (Caulis Akebiae, Akebia Stem) has three species, namely Bái Mù Tōng (Akebia Trifoliata Varaustralis), Chuān Mù Tōng (Caulis Clematidis Armandii, Clematidis Caulis), and toxic Guān Mù Tōng (Caulis Aristolochiae Manshuriensis, Manchurian Dutchmans Pipe Stem) that now forbidden to be used for medicinal purposes.

[Contraindications during pregnancy] Medicinals should be used with more cautions during pregnancy, as modern research indicate that improper medication may cause fetal deformity or even miscarriage. Generally, Chinese mediicnals are safe to the fetus, but some may generate side effects or lead to problems for the fetus, even causing miscarriage. Our ancestors have accumulated abundant experiences on contraindications during pregnancy, which are categorized into the following aspects:

1. Drastic toxicants such as Bān Máo (Mylabris, Cantharide) cantharide, Yuán Qīng (Lytta Caraganae), Wū Tōu (Aconite Main Tuber), Mā Qián Zī (Semen Strychni, Nux Vomica Seed), and Chán Sū (Venenum Bufonis, Toad Venom) are harmful to the fetus and may cause miscarriage.

2. Drastic purgatives such as Bā Dòu (Fructus Crotonis, croton seed), Dà Huáng (Radix et Rhizoma Rhei, Rhubarb Root and Rhizome), Gān Suì (Radix Kansui, Gansui Root), Dà Jí (Radix Euphorbiae Pekinensis, Peking Euphorbia Root), Yuán Huā (Flos Genkwa, Lilac Daphne Flower Bud), and Qiān Niú Zī (Semen Pharbitidis, Pharbitidis Seed) may result in miscarriage.

3. Blood-activating and blood stasis-relieving medicinals such as Niú Xī (Radix Achyranthis Bidentatae, Two-toothed Achyranthes Root), Shuǐ Zhī (Hirudo, leech), Méng Chóng (Tabanus, gradfly), Sān Léng (Rhizoma Sparganii, Common Burr Reed Tuber), É Zhú (Rhizoma
Curcumae, Curcumae Rhizome), and Táo Rén (Semen Persicae, Peach Seed) can promote blood circulation, strengthen uterine contraction, and eventually cause miscarriage.

4. Acrid, aromatic, and scattering medicines such as Shè Xiāng (Moschus, Cow Bezoar) may excite uterus and lead to miscarriage.

5. Acrid-hot medicinals such as Fù Zǐ (Radix Aconiti Lateralis Praeparata, Monkshood), Ròu Guì (Cortex Cinnamomi Cinnamon Bark), and Gān Jiāng (Rhizoma Zingiberis, Dried Ginger Rhizome) are harsh substances and easy to influence the fetus, or even cause miscarriage.

In the opinion of the ancients, medicinals such as Bàn Xià (Rhizoma Pinelliae, Pinellia Rhizome), Chán Tuì (Periostracum Cicadae, Cicada Moulting), Yí Yī Rén (Semen Coicis, Coix Seed), Dài Zhě Shí (Haematitum, Hematite), Zào Jiāo (Fructus Gleditsiae, Chinese Honeylocust), Tōng Cǎo (Medulla Tetrapanacis, Rice Paper Plant Pith), Qú Mài (Herba Dianthi, Lilac Pink Herb), and Bái Máo Gēn (Rhizoma Imperatae, Woolly Grass) are generally contraindicated during pregnancy. However, they can be prescribed with the utmost caution and only for carefully selected patients, as The Yellow Emperor’s Inner Classic (黄帝内经, Huáng Dì Nèi Jīng) stated “toxicants are applicable only when they are used carefully and for the right pathogenic changes”. Some of the above mentioned medicinals may not be harmful to the fetus and still need further research.

**Dosage of Chinese materia medica**

[Dosage of Chinese materia medica] Dosage is of great importance for the treatment of disease, especially when composing a right prescription. Traditionally it was a secret reserved for doctors and was not discussed publicly, which also indicates its importance for improving therapeutic effect and reducing side effects.

Compared with chemicals, dosage of Chinese materia medica is featured by (1) mild nature. These moderate medicinals are used in the maximum safe dose or even higher when necessary; and (2) flexibility of use especially for decoction. Under the guidance of theories of traditional Chinese medicine, the variables governing dosage include the state of illness, patient’s constitution, and different usage.
Now, metric measurements are used for the dosage, gram for weight, and milliliter for volume. To convert back to the traditional measurement, one Liǎng is equal to 30 g, and one Qián is equal to 3 g.

Dosage of Chinese materia medica is determined by medicinal properties and combination, usage, state of illness, and patient’s constitution and age. For instance, moderate medicinals are used in high doses with a large dosage range; heavy and fresh substances are usually prescribed in larger doses; toxic and violent medicinals are used with cautions as the old saying goes “Má Huáng (Herba Ephedrae, Ephedra) should be less than 9 g, and Xì Xīn (Radix et Rhizoma Asari, Manchurian Wild Ginger) less than 3 g”. If a medicinal is prescribed by itself or with just a few other medicinals, a larger dose is preferred. For instance, Mā Chī Xiàn (Herba Portulacae, Purslane Herb) is prescribed alone over 150 g for treating dysentery. If a substance is used as a principal substance in formula, a larger dose is prescribed. For instance, Yī Mĭ Căo (Herba Leonuri, Motherwort) is used as a chief medicinal over 60 g in the treatment of nephritis edema, and its dose is decreased to 10–15 g in other formulas. Other important factors are the kind of preparation used, severity of disorder, patient’s constitution, and age. The dosage is usually less for pills and powders than for decoction; severe and emergent problems usually require a larger dose, Rĕn Shĕn (Radix et Rhizoma Ginseng, Ginseng), for instance, is used up to over 20 g for rescuing collapse, and reduced to 5 g as a general tonic; strong patients need a larger dosage; and the young cannot tolerate too large a dose (e.g., 1/4 of adult dosage for patient less than one year old, 1/3 for 1–3 years old, 1/2 for 4–6 years old, 3/4 for 7–10 years old, and adult dosage for above 10 years old). Dosage also depends on climate and region.

To sum up, dosage prescription is with flexibility, practitioners are expected to integrate traditional Chinese medicine literatures with their own clinical experiences in an effort of improving therapeutic effect and reducing side effects.

**Daily practice**

1. How to prevent the adverse reactions of Chinese materia medica?
2. What are the factors influencing the dose of Chinese materia medica?