

Hypothesis

Sasang Constitutional Medicine as a Holistic Tailored Medicine

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Sasang constitutional medicine (SCM) is a unique traditional Korean therapeutic alternative form of medicine. Based on the Yin and Yang theory and on Confucianism, humans are classified into four constitutions. These differ in terms of (i) sensitivity to certain groups of herbs and medicines, (ii) equilibrium among internal organic functions, (iii) physical features and (iv) psychological characteristics. We propose that two main axes in the physiopathology of SCM (food intake/waste discharge and consuming/storing Qi and body fluids) are equivalent to the process of internal–external exchange and catabolism/anabolism in modern physiology, respectively. We then used this hypothesis to discuss the physiological and pathological principles of SCM. Constitution-based medicine is based on the theory that some medicinal herbs and remedies are only appropriate for certain constitutions and can cause adverse effects in others. The constitutional approach of SCM share the same vision as tailored medicine; an individualized therapy that can minimize the risk of adverse reaction while increasing the efficacy and an individualized self-regulation that can help prevent specific susceptible chronic disease and live healthily. There is still a long way to this goal for both SCM and tailored medicine, but we may benefit from systems approaches such as systems biology. We suggest that constitutional perspective of SCM and our hypothesis of two main processes may provide a novel insight for further studies.

Keywords: constitutional approach – metabolism – Sasang constitutional medicine – tailored medicine

Introduction

Over the last decade, treatment with Sasang constitutional medicine (SCM) has increased significantly in Korea. A survey by the Korean Institute of Oriental Medicine showed that the proportion of SCM within the Oriental medicine (OM) market in Korea increased to 23.8% in 2004; it is predicted to grow to 30.6% by 2015. Meanwhile, the overall scale of OM services was estimated to increase 2.8 times (1). This change accompanied a marked rise in the number of OM hospitals and clinics

in Korea (1,2). In 2007, there were 138 OM hospitals and 10 895 OM clinics in Korea, compared with 81 OM hospitals and 6172 OM clinics in 1996 (1). The use of SCM has escalated, with a strong competition noted among these clinics, suggesting that SCM may have better efficacy than conventional OM.

Throughout the ages and in most countries, constitutional medicine has developed into various types. The few examples are: the ‘Four Humors’ theory of Hippocrates and Galen, the three categories of body shape by modern scientists Kretschmer and Sheldon (3); and Ayurvedic medicine based on therapeutic measurements related to physical, mental, social and spiritual harmonies (4).

SCM, a unique traditional Korean constitution-based medicine, originated from the theory that population

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types display different herbal responses. As such, physical constitution is classified according to personal sensitivity to certain drug groups. SCM has developed and systematized physiological, pathological, herbal pharmacological, food treatment and mind–body-related theories. Even before the development of SCM, different sensitivities to drugs were expressed as symptomatic types (證型) in traditional Chinese medicine (TCM). However, these symptomatic types are regarded as temporary, while Sasang constitutions are congenital (5,6). SCM is based on the view that humans have different mind types, which decide the equilibrium state of organ function.

In this article, we raised a hypothetical interpretation to understand the essence of SCM and we used this hypothesis to discuss the core principles of SCM as a tailored medicinal approach.

Historical Background

Prior to the introduction of SCM, the concept of constitution in the discipline of OM was first mentioned in Chapter 72 of *LingShu* (靈樞) of *Inner Classic* (黃帝內經) as five body types. Based on an analysis of old medical literature, Je Ma Lee, a Korean OM practitioner, postulated the theory of SCM in 1894. He indicated that, among the five body types described in the *Inner Classic* (Greater Yang type, Lesser Yang type, Greater Yin type, Lesser Yin type and Yin–Yang balanced type), the Yin–Yang balanced type, which was described as a perfect human type, did not exist. Moreover, this classification was not practically used for treatment (7).

His observation implied that the adverse response of the human body to a specific medicinal herb was not temporary but congenitally influenced. He also emphasized the mutual interaction of mind and body in a whole as the crucial point of human physiology and pathology. As he was a devout Neo-Confucian, the mind–body interaction concept in SCM of Je Ma Lee was based on the four Neo-Confucianism moral concepts Benevolence, Rightness, Propriety and Wisdom (8). By borrowing a nomenclature of quaternary from *I Ching* (the I Ching or Book of Change) (9), he created the SCM theory, classifying human beings into four constitutional types: Greater Yang (TaeYang), Lesser Yang (SoYang), Greater Yin (TaeEum) and Lesser Yin (SoEum), and developed systematically unique physiological, pathological, herbal pharmacological, dietary and mind–body-related theories. For example, SCM uses the same medicinal herbs found in TCM but they operate on a different principle based on constitutional perspective (7).

Constitutional Physiological Principles of SCM

TCM describes the human internal visceral system, which consists of two groups, *zang* and *fu* viscera, based on the

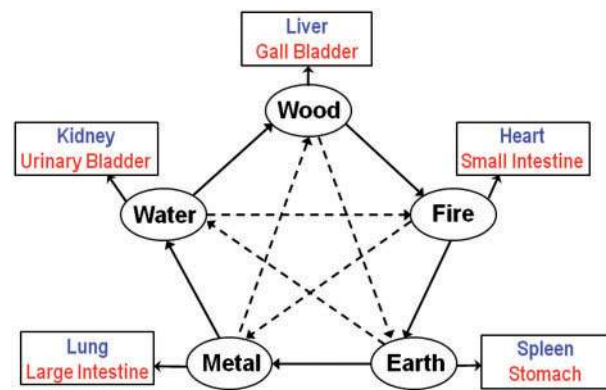


Figure 1. Visceral theory according to TCM [adapted from Patwardhan (4)]. Mutual nourishment cycle (Solid arrow), Mutual restraint cycle (dashed arrows), *Zang* viscera (blue) and *Fu* viscera (red).

concept of the five elements of the material world: fire, metal, wood, earth and water. The *zang* viscera include the heart, lungs, liver, spleen and kidneys; they are in a mutual relation to the corresponding *fu* organs, the small intestine, the large intestine, the gall bladder, the stomach and the urinary bladder, respectively. By the rule of the five elements, the proper functioning of *zang* and *fu* viscera in an interactive circular principle maintains the balance between Yin and Yang in the human body, the essential condition for health (4,10) (Fig. 1).

SCM excludes the theory of the five elements and considers the human internal visceral system differently. Even though the visceral theory of SCM uses the same terminology found in TCM, they have different meanings. SCM regards the heart as the king among the five viscera, which is equivalent to the mind. Departing from the visceral theory in TCM where viscera are assigned in pairs, *zang* and *fu*, SCM assumes a theory of visceral groups: the lung, kidney, liver and spleen groups. The lung group includes lungs, tongue, esophagus region, ears, brain and skin. The spleen group consists of spleen, stomach, breasts, eyes and tendon. The constituents of the liver group are the liver, small intestine, nose, lumbar region and muscles. The kidney group has the kidney, large intestine, urethra, bladder, mouth and bones. Among these groups, it is believed that specific inter-regulatory relations are present between specific pairs of visceral groups. As such, visceral groups are classified into two pairs: one consists of the spleen and the kidney group and the other is composed of the lung and the liver group. The relation in each pair of visceral groups is compared to the balancing state of a seesaw. In this respect, a hyperactive state of one group leads to a relative deficient state of its counterpart. (Fig. 2).

Physiological Functions of Visceral Groups and the Key Features of Constitutional Types

According to SCM, the spleen group is in charge of the intake of raw materials such as food and drink, whereas

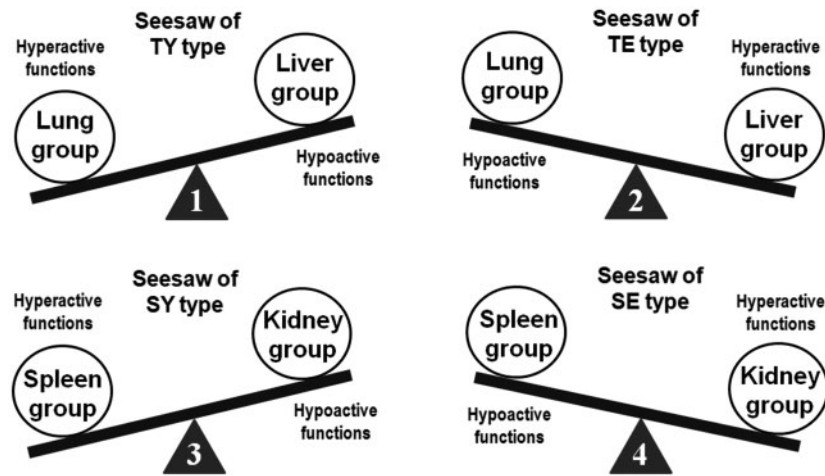


Figure 2. Visceral theory according to SCM. The state of hyperactive lung group leads to hypoactive state of liver group in TY type, but vice versa in TE types (1 and 2) and the state of hyperactive spleen group leads to hypoactive state of kidney group in SY type, but vice versa in SE types (3 and 4).

the kidney group regulates the process of waste discharge, including bowel movement and urination. The functions of the lung and liver groups are described as dealing with the critical bodily substances including the Qi (氣) and body fluid (液). Within this perspective, the lung group is in charge of the process of consuming Qi and body fluid, whereas the liver group is responsible for the process of producing and storing these inner substances.

According to the perspective of SCM, most of humans have a tendency of skewed state in terms of the seesaw balance between the visceral groups of the specific pair: the lung–liver pair and the spleen–kidney pair. Based on a skewed equilibrium of these visceral group pairs, SCM classifies human beings into four constitutions: TaeYang type (太陽人, Greater Yang person—TY), SoYang type (少陽人, Lesser Yang person—SY), TaeEum type (太陰人, Greater Yin person—TE) and SoEum type (少陰人, Lesser Yin person—SE) (7,11).

The TY type has a hyperactive lung group and a hypoactive liver group that manifests a state of strong consumption and weak storage of Qi and body fluid. In contrast, the lungs of the TE type are hypoactive, whereas the liver of this type is hyperactive. As such, the TE type is characterized by a state of weak consumption and strong storage of Qi and body fluid. The SY type has a hyperactive spleen group and a hypoactive kidney group, which leads to a consistent state of strong raw material intake and weak waste discharge. In contrast, the SE type has a state of weak raw material intake and strong waste discharge due to its congenital hypoactive spleen group and hyperactive kidney group. Such differences in physiological patterns result in a series of typically distinct characteristics of each constitution, including external appearance, personality traits, manifestation of healthy and unhealthy states and response to drugs and treatment (7,11,12) (Table 1).

A Hypothetical Interpretation of SCM Physiological Theory

Energy is the most important thing in living organisms, which drives ‘the capacity for changes’ in every process and reaction. Two basic types of energy exist: kinetic (energy of movement) and potential (energy of state or position). These two types can be transformed from one type into another. The metabolism generally refers to the transformation of energy between different types (13), and two metabolic pathways are catabolism and anabolism. All living organisms must obtain energy in the form of absorbed raw materials from the external environment. Metabolism transforms these raw materials and stores potential energy into forms that can be used by living cells as well as provides kinetic energy for living activities (14). The human body is a highly complex structure. However, we can assume holistically the two most crucial processes of human body: one is the process of exchange of materials between the internal environment of the human body and the external environment through food, drink and air intake, and waste discharge (so called internal–external exchange); and the other is the process of energy transformation occurring within the body, catabolism and anabolism. The balance between opposite sub-processes within these two processes is necessary to maintain the stability of homeostasis (13,14) (Fig. 3).

In both SCM and TCM theories, Qi (氣) is the most essential element, the ‘driving force’ that constitutes the body and maintains the activities of life, visceral functions and metabolism (15). In SCM, body fluid (液) is a general term for all kinds of normal fluid in the body [this differs from the same concept in TCM that excludes blood (血)]. In a generalized scope, the essence of Qi in SCM can be compared with that of energy in modern

Table 1. General characteristics of the four constitutions in SCM [adapted from Chae *et al.* (12)]

Characteristics	Constitutions			
	TY type	SY type	TE type	SE type
Hyperactive viscera and functions	Lung—process of consuming of Qi and body fluid	Spleen—process of raw material intake	Liver—process of producing and storing Qi and body fluid	Kidney—process of waste discharge
Hypoactive viscera and functions	Liver—process of producing and storing Qi and body fluid	Kidney—process of waste discharge	Lung—process of consuming of Qi and body fluid	Spleen—process of raw material intake
Personality traits	Creative Positive Progressive Charismatic Heroic Rash mind	Unstable Easily get bored Sacrificing Righteous Easily acceptable Hot temper Anxious mind	Gentle Commercial Endurable Humorous Coward Fearful mind	Neat, Mild Negative Selfish Organized Jealous Persistent Nervous mind
External appearance	Developed nape of the neck Slender waist	Developed chest Small hip	Thick waist Weak nape of the neck	Developed hip Weak chest
Healthy sign	Smooth urination	Good bowel movement	Existence of perspiration	Good digestion
Unhealthy sign	Musculoskeletal weakness, emesis	Existence of constipation	Absence of perspiration	Indigestion

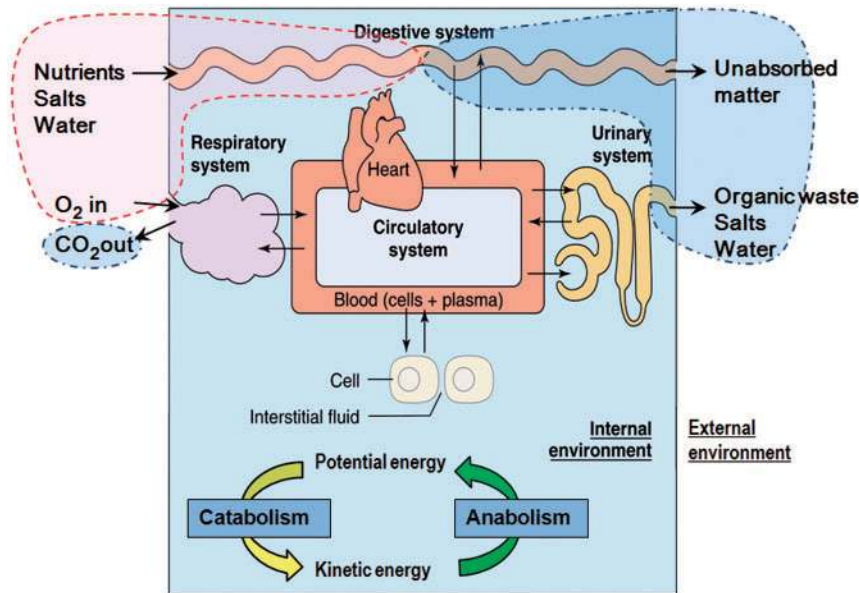


Figure 3. Two processes to maintain homeostasis in modern physiology [adapted from Vander *et al.* (14)]. Raw materials intake (pink broken circle), waste discharge (blue broken circle), catabolism (Yellow solid arrows), Anabolism (green solid arrows).

physiology (MP). The body fluid in SCM may refer to human body fluid compartments, including the plasma, interstitial fluid and intracellular fluid. Metabolism (catabolic and anabolic reactions) occurs in every cell of the body and its products are exchanged within the environment of the plasma and interstitial fluid.

The metabolic process in MP provides energy, kinetic and potential energies, whereas metabolism in SCM produces and regulates Qi. Since catabolism breaks down complex molecules into simple ones and releases kinetic energy, this pathway can be compared with the process of consuming Qi in SCM, the function of the lung group. Similarly, anabolism, which links together

simple molecules to form more complex molecules and stores potential energy, is comparable with the process of producing and storing Qi in SCM, the function of the liver group.

In terms of interior–exterior exchange, the process of taking up raw materials from the external environment to produce Qi in SCM (function of the spleen) corresponds to the process of digestion and absorption of food and water and inhaling air in MP. In this sense, the function of the kidney group in SCM may refer to the exhaling air function, urination and formation and discharge of feces (Figs 3 and 4). Therefore, it has to be noted once more that the names and functions of the viscera in SCM is not

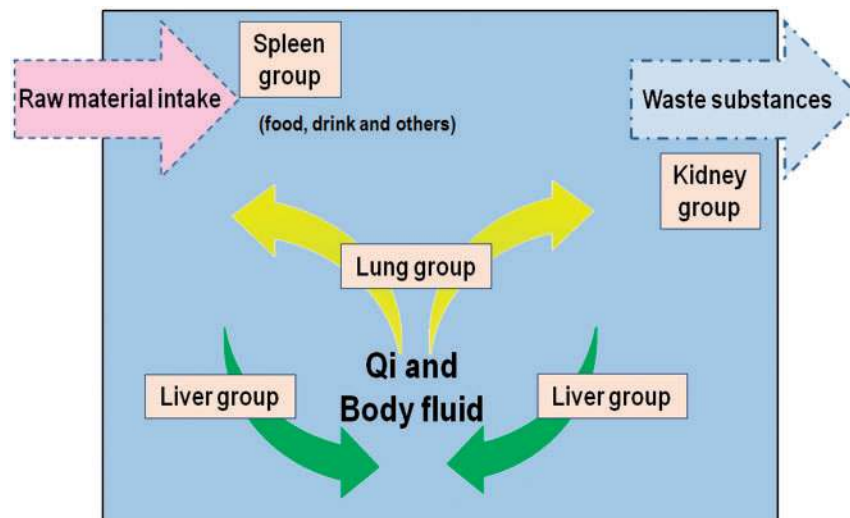


Figure 4. Physiological principles of SCM. Raw materials intake (pink broken arrows), waste discharge (blue broken arrows), consumption of Qi and Body fluid (yellow solid arrows), storage of Qi and body fluid (green solid arrows).

equivalent with the anatomical organs with the apparently same names in MP.

One interesting principle in SCM is the classification of groups of functions into opposite and mutual relationships. If the spleen is hyperactive, the kidney is hypoactive correspondingly. We can find the same sense in MP, that hyperactive absorption of food and water can result in a suppression of fecal formation and constipation will occur. This antagonism has been seen in metabolism between catabolic and anabolic reactions, as well as between the process of consuming and storing Qi in SCM. In the population, the capacity of two main processes, internal-external exchange and metabolism, varies from individual to individual. These differences were briefly classified in terms of the four constitutions of SCM.

Understanding Pathological Principles of SCM

According to SCM, the physiological and pathological features of each constitution are determined by hyperactive and hypoactive states of visceral groups that are believed to be intrinsic and congenital. The hypoactive part is generally more important; if this congenital shortcoming is controlled well, the healthy state of body can be accomplished (7,11).

Aforementioned, the SY type has a tendency of hypoactive kidney group. In other words, this type has a weak capacity of waste discharge. The waste discharge function in SCM implies both urination and fecal discharge. As such, in the SY type, smooth bowel movement implies a healthy state, whereas constipation implies an unhealthy state (Table 1). Also, SY type people are more vulnerable to disorders related to urinary system such as cystitis and renal diseases (16–18).

In contrast, SE type individuals have a hypoactive spleen group that leads to poor management of food intake and digestion. Consequently, these individuals frequently undergo digestive malfunctions such as chronic indigestion, gastroptosis and gastrodynamics (17,19,20). Therefore, maintenance of good digestive function is important for the healthy state in SE type individuals. Vice versa, indigestion implies unhealthy state of SE people.

TY and TE type physiological characteristics are related closely to the metabolic process dealing with transformation of inner body materials, Qi and body fluid. In adults, the rates of catabolism and anabolism are approximately equal. The energy released through catabolism in basal condition is called basal metabolic rate (BMR). In normal condition, body fluid is excreted out to the external environment through two main ways, perspiration and urination. Excessive perspiration can result in a decreased amount of urine and vice versa (14).

The TY type is characterized by a hyperactive lung group and a hypoactive liver group that is regarded to be a state of higher catabolism than anabolism, according to SCM theory. Increased catabolism produces more heat and results in high BMR. The body temperature-controlling mechanism regulates this condition by evaporation of sweat. Consequently, excess sweating causes less human body fluid to the urinary system and less amount of urine expelled. As such, urination is a functional shortcoming of the TY type, which means good urination is predictor of a healthy state. Actually, there was no available scientific report related to this explanation and the population of TY type is very small, 0.03–0.1% of the whole population (7,11,12).

In contrast, the TE type's physiological features may be equal to an anabolism-dominant state, which may lead to

low BMR. A corpulent body figure and the tendency to be overweight are representative features of the TE type (16,17,21). Chae H. *et al.* also found that the TE type had higher body fat mass than both SE and SY types (12). Evidences showed that lower BMR is a predictor of future body weight gain (22–25) and this risk may related to genetic background (26). Unfortunately, however, there is yet no precise study on the relation between BMR and constitutions in SCM. The plausible low BMR implies that the functional shortcoming of the TE type is perspiration; therefore, an adequate perspiration is a predictor of a healthy state (Table 1).

In an unhealthy state, anabolism in the TY type is more depressed, which causes the regression of the muscle protein synthesis process (27). This may explain the susceptibility of the TY type to muscular malfunctions (28,29). The regression of catabolism in TE types leads to a lower state of BMR, which inhibits perspiration and promotes the synthesis to store more energy. Consequently, the TE type tends to gain weight and cannot excrete sweat. Cardiovascular and metabolic disorders, such as hypertension, diabetes mellitus, hyperlipidemia, appear with high prevalence in the TE type (19,26). Several research studies indicated that low BMR is associated with a metabolic syndrome (30,31).

Since the congenital shortcoming is the key point of physiological and pathological theory in SCM, the main principle for treatment is activating and strengthening the hypoactive visceral groups. This viewpoint implies that while an individual may suffer from different and complicated illnesses, these sufferings originate from the same cause, the congenital hypoactive functions. In that sense, curativeness in SCM emphasizes the promotion and enhancement of the capacity of the body to heal itself.

Constitutional Approach to Herbal Medicines

SCM uses the same medicinal herbs used in TCM. However, the theoretical principles of prescription are different. Medicinal herbs in TCM were classified based on their curative effect, corresponding to a specific syndrome. The principle to form a prescription is *Bianzheng Lunzhi* and *Bienbing Lunzhi*, which focuses on the temporarily acquired symptoms or syndromes (32). Contraindications and toxicity are important points to be considered in the prescription of medicinal herbs. Depending on drug properties concerning effectiveness and toxicity, medicinal herbs are classified into three groups: high-level herbs (herbs without any toxicity, can be used also as food materials), middle-level herbs (herbs with slight toxicity and specific therapeutic effectiveness) and low-level herbs (herbs with high toxicity but with specific therapeutic effectiveness) (33). European traditional herbal medicine also applies a certain medicinal herb for a specific disease or symptom and

considers its adverse effect within the toxic property (34). Drug toxicity and treatment outcome depend on many factors including additional genetic and non-genetic factors. The variability in cytochrome P450 (CYP) activity also depends on environmental influences, biological factors, and genetic polymorphisms in CYP genes and their regulators (35). As such, therapeutic effectiveness and adverse effects of a drug/medicinal herb is not only determined by the herbal property itself because an effective drug for one person may be a poison for the other.

The principle of SCM treatment is based on the reinforcement of the hypoactive visceral groups. Thus, medicinal herbs of SCM are divided into four groups that correspond to the four constitutions (Table 2). Under this rule, medicinal herbs and herbal remedies belonging to a certain constitution cannot be used for others; otherwise, this can result in no effect or an adverse effect (12,36–38). For example, in comparison with the classification of TCM, medicinal herbs for the SE type belong to the categories of Qi-tonifying medicinal (補氣藥), blood-tonifying medicinal (補血藥) and interior warming medicinal (溫裏藥) (15,39). Almost all SE herbs have warm properties and digestive stimulation effects, therefore, they are helpful in strengthening the process of raw material intake and providing more material to produce Qi. Almost all of the medicinal herbs for the SY type belong to categories of medicine for clearing heat (清熱藥), enriching Yin (滋陰藥) and inducing diuresis (利水藥) (15,39) (Table 2).

In contrast to SE herbs, SY herbs, which have cooling or cold properties, are able to strengthen the shortcoming of the SY type, the waste discharge process. SE herbs should not be applied for SY type individuals and vice versa; otherwise, it may cause remarkable adverse effects (36,37). *Radix panax ginseng* is commonly known as a high-level herb for tonifying Qi, but this herb can cause headache, rashes and allergic reactions in SY individuals (40). *Radix Rehmanniae Glutinosae* is an effective herb for SY type, but it may cause serious indigestion for SE type individuals (7,11).

Medicinal herbs of the TE type are present in various categories in the herbal medicine classification of TCM, but these are generally characterized by strong dispersing effect (發散) and eliminating dampness effect (除濕) (15,39) (Table 2). Dispersing medicinal (發散藥) is used to promote perspiration and eliminating dampness medicinal (除濕藥) is used to resolve dampness, a pathogenic factor characterized by its impediment to the Qi movement and its turbidity, heaviness, stickiness and downward flowing properties (15). It is reasonable to suggest that the effect of dispersing and eliminating dampness can strengthen hypoactive catabolism in the TE type. *Ephedra sinica*, an effective herb for the TE type, may increase metabolic rate and catabolism due to its ephedrine constituent, which mimics the action of

Table 2. Distribution of commonly used medicinal herbs for constitutions in SCM [adapted from Kim JK (36–38)]

Effects according to TCM	SE type	SY type	TE type	TY type
Qi-tonify	<i>Radix Panax Ginseng</i> <i>Rhizoma Atractylodis Macrocephalae</i> <i>Radix Glycyrrhizae Uralensis</i> <i>Radix Astragali Membranacei</i> <i>Fructus Zizyphi Jujubae</i>			
Regulate Qi	<i>Cortex Fraxini</i> <i>Pericarpium Citri Reticulatae Viride</i> <i>Pericarpium Arecae Catechu</i> <i>Fructus Immaturus Citri Aurantii</i> <i>Rhizoma Cyperi Rotundi</i> <i>Radix Aucklandiae Lappae</i> <i>Radix Linderae Strychnifoliae</i>			
Enrich Yang	<i>Fructus Alpiniae Oxyphyllae</i> <i>Fructus Psoraleae Corylifoliae</i> <i>Placenta Hominis</i>		<i>Cornu Cervi Parvum</i>	
Blood-tonify	<i>Radix Polygoni Multiflori</i> <i>Radix Angelicae Sinensis</i> <i>Radix Ligustici Chuanxiong</i> <i>Radix Paeoniae Lactiflorae</i>	<i>Radix Rehmanniae</i> <i>Glutinosae Conquिताe</i>	<i>Arillus Euphoriae Longanae</i>	
Warm interior parts	<i>Radix Aconiti Carmichaeli Praeparata</i> <i>Rhizom Zingiberis Officinalis</i> <i>Cortex Cinnamomi Cassiae</i> <i>Fructus Evodiae Rutaecarpae</i> <i>Fructus Foeniculi Vulgaris</i> <i>Rhizoma Alpiniae Officinari</i>			
Clear heat		<i>Gypsum</i> <i>Rhizoma Coptidis</i> <i>Cortex Phellodendri,</i> <i>Radix Sophorae Flavescentsis</i> <i>Fructus Forsythiae Suspensae</i> <i>Flos Lonicerae Japonicae</i> <i>Rhizoma Anemarrhenae</i> <i>Asphodeloidis Fructus</i> <i>Gardeniae Jasminoidis</i> <i>Cortex Moutan Radicis</i>	<i>Radix Scutellariae</i> <i>Baicalensis</i> <i>Calculus Bovis</i>	<i>Rhizoma Phragmitis Communis</i>
Enrich Yin		<i>Radix Rehmanniae Glutinosae</i> <i>Fructus Lycii</i> <i>Radix Scrophulariae Ningpoensis</i>	<i>Chinese Asparagus Tuber</i> <i>Radix Dioscoreae Oppositae</i>	
Induce diuresis		<i>Sclerotium Poriae Cocos</i> <i>Sclerotium Polypori Umbellati</i> <i>Rhizoma Alismatis Orientalis</i> <i>Semen Plantaginis</i> <i>Akebia quinata</i> <i>Talcum</i>	<i>Semen Coicis</i> <i>Lachryma-jobi</i>	
Dispersing effect	<i>Ramulus Cinnamomi Cassiae</i>	<i>Flos Schizonepetae Tenuifoliae</i> <i>Radix Ledebouriellae</i> <i>Divaricatae</i> <i>Rhizoma et Radix Notopterygii</i> <i>Radix Angelicae Pubescentis</i>	<i>Herba Ephedra sinica</i> <i>Radix Puerariae</i> <i>Rhizoma Cimicifugae</i> <i>Radix Angelicae Dahuricae</i> <i>Flos Chrysanthemi Morifolii</i> <i>Rhizoma et Radix Ligustici</i>	
Eliminate dampness	<i>Rhizoma Pinelliae Ternatae</i>		<i>Semen Pruni Armeniacae</i> <i>Flos Tussilaginis Farfarae</i> <i>Cortex Mori Albae Radicis</i> <i>Semen Ginkgo Bilobae</i> <i>Radix Platycodi Grandiflori</i>	
Strengthen tendons and bones				<i>Cortex Acanthopanax</i> <i>Gracilistylis Radicis</i>

epinephrine (14). Kim *et al.* (41) found that *E. sinica* was effective in maintaining BMR in obese, premenopausal women taking a low-calorie diet. However, *E. sinica* should not be used for other constitutions, especially

for the SE type due to serious effects such as insomnia, motor restlessness, and tachycardia (12,42).

As the population of the TY type is extremely small (at ~0.03–0.1%), medicinal herbs for this condition were

less available. But few herbs have been noticed for the TY type recorded, including musculoskeletal strengthening medicinal such as *Acanthopanax root bark*. In summary, SCM is characterized by the constitution-based approach in which specific herbal medications match constitutions. As a group of specific medicinal herbs is effective for specific constitutions but causes adverse reactions in others, herbal remedies for each constitution in SCM are prescribed with a limited number of specific medicinal herbs.

Constitutional Approach of SCM and Tailored Medicine

The human DNA is 99.9% identical, but the difference of only 0.01% in the human genome results in our diversity (43). People with different inherited genetic information develop distinctive personality traits, predisposition to certain kinds of diseases and reaction to certain drugs. The ultimate goal of medical science is to develop an overall improved therapy, which minimizes the risk of adverse reactions while increasing efficacy (35). Recent breakthroughs in biotechnology enable us to tailor the practice of medicine to the individual, which opens a new trend in medical science known as tailored medicine (also called individualized medicine or personalized medicine). Tailored medicine provides the link between an individual's molecular and clinical profile, allowing physicians to make the right patient-care decisions. It also allows patients the opportunity to make informed and directed lifestyle decisions for their future well-being (44).

Within this perspective, SCM shares the same vision with tailored medicine—that individuals not only can be cared for with individualized therapy, which takes into account entirely their distinctive factors, but they also can prevent specific susceptible chronic diseases and live healthily by individualized self-regulation. The shortcoming of an individual due to the hypoactive visceral group should be controlled by specific constitutional medication, diet, physical training and psychological caution. Scientific evidence indicates that the constitutional basis of SCM has a genetic background. It is commonly known that human leukocyte antigen (HLA) types are variable in humans and are closely associated with the determination of susceptibility to certain diseases. Among individuals possessing the HLA-C*4 allele, the frequency of the TE type is higher than that in the SE and SY types. In contrast, the frequency of the SE and SY types is highest in the groups containing HLA-C*07 allele and HLA-C*14, respectively (45). There is significant evidence on the relations between TY-type and A1, A11, B37, B70/71, DRBI*14 and DRBI*15 alleles (46). A relation between genome and constitution was also reported in other fields of

constitutional medicine. Patwardhan *et al.* (47,48) observed a correlation between HLA alleles and the *prakriti* type, constitutional type in Ayurveda. Chen *et al.* (49) reported a relationship between HLA and human types in the theory of physical constitutions of TCM.

SCM is more and more popularly used among the Korean population and its spread to the world resulted from its constitutional basis and individualized approach. Although many sound scientific studies have been carried out, it is a great challenge to understand the essence of SCM in terms of modern medicine. Chae *et al.* (12) postulated a hypothesis that helped to interpret constitutions in SCM into typologies of psychological and physical traits. This perspective can partly deal with psychological and physical aspects of constitutions in SCM, but the distinctions of drug response, susceptibility to certain diseases, and overall factors in complex relation were not well defined.

In this article, we proposed that the physiological and pathological principles of SCM are related to two main processes, raw material intake/waste discharge and catabolism/anabolism, and we simply explained distinct features of constitutions using this hypothesis.

Toward the goal of establishing tailored medicine, a multigene or multifactorial approach will be needed. The constitutional perspective of SCM may provide a novel means to create tailored treatments. As the bases of SCM and tailored medicine are holistic, a systems approach such as systems biology may be an appropriate tool to gain insights into these bases (50).

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References

1. Kim HJ, Kim JY. A study on the present status of constitutional medical care service. *J Sasang Constitutional Med* 2006;18:166–74.
2. Cha WS, Oh JH, Park HJ, Ahn SW, Hong SY, Kim NI. Historical difference between traditional Korean medicine and traditional Chinese medicine. *Neurol Res* 2007;29:S5–9.
3. Strelau J. *Temperament, a Psychological Perspective*. New York: Kluwer Academic Publishers, 2002, 19–29.
4. Patwardhan B, Warude D, Pushpangadan P, Bhatt N. Ayurveda and traditional Chinese medicine: a comparative overview. *eCAM* 2005;2:465–73.
5. Kim DY, Lee JW, Kim DR. Statistical study on heredity in Sasang constitutional medicine. *J Sasang Constitutional Med* 1999;11: 159–68.
6. Lee SH, Yoon YS, Kim HG, Kim JY. Clinical study on the distribution of Sasang constitutions between parents and their off springs. *Korean J Oriental Physiol Pathol* 2004;18:1904–7.
7. Song IB. *An Introduction to Sasang Constitutional Medicine*. Seoul: Jimoondang International, 2005.
8. Rodney LT. *The Illustrated Encyclopedia of Confucianism*. New York: The Rosen Publishing Group, 2005.

9. Baynes CF, Wilhelm H. *The I Ching or Book of Changes*. Princeton, NJ: Princeton University Press, 1967.
10. Ross J. *Zang Fu—The Organ Systems of Traditional Chinese Medicine*, 2nd edn. Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto, Churchill Livingstone, 1985.
11. Lee JM, Choi SH. *Longevity & Life Preservation in Oriental Medicine*. Seoul: Kyung Hee University Press, 1996 (translated).
12. Chae H, Lyoo IK, Lee SJ, Cho S, Bae H, Hong M, et al. An alternative way to individualized medicine: psychological and physical traits of Sasang typology. *J Altern Complement Med* 2003;9:519–28.
13. Purves WK, Sadava D, Orians GH, Heller CH. *Life: The Science of Biology*, 7th edn. New York: Sinauer Associates, Inc & W.H. Freeman Company, 2003.
14. Vander A, Sherman J, Luciano D. *Human Physiology: The Mechanism of Body Function*, 8th edn. New York: The McGraw-Hill Companies, 2001.
15. *WHO International Standard Terminologies on Traditional Medicine in the Western Pacific Region*. World Health Organization, Geneva, 2007.
16. Kim YW, Kim JW. A clinical study of the type of disease and symptom according to Sasang constitution classification II. *J Sasang Constitutional Med* 1999;11:119–35.
17. Lee YO, Kim JW. A clinical study of the type of disease and symptom according to Sasang constitution classification II. *J Sasang Constitutional Med* 2002;14:72–84.
18. Sohn EH, Kwak CK, Lee EJ. Assessment of the clinical efficacy of the health index in the Sasang constitutions: short form -36 based study. *J Sasang Constitutional Med* 2004;16:25–33.
19. Jang ES, Kim HS, Lee HJ, Baek YH, Lee SW. The clinical study on the ordinary and pathological symptoms according to Sasang constitution. *J Sasang Constitutional Med* 2007;19:144–55.
20. Baek TH, Choi JR, Park SS. A correlation research of digestion according to Sasang constitution. *J Sasang Constitutional Med* 2004;16:112–19.
21. Lee TG, Lee SK, Choe BK, Song IB. A study on the prevalence of chronic diseases according to Sasang constitution at a Health Examination Center. *J Sasang Constitutional Med* 2005;17:32–45.
22. Araujo-Vilar D, Sarmiento LM, Barros N, Da Silva-Freitas ATC, Ramazanov A, Lado-Abeal J, et al. Resting metabolic rate is reduced in some subpopulations of obese subjects. *Obes Metab* 2008;4:22–7.
23. Bargieri JV, Quadros AA, Pereira RD, Oliveira AJ, Lazaretti CM, Silva AC. Basal metabolic rate and body composition in patients with post-polio syndrome. *Ann Nutr Metab* 2008;53:199–204.
24. Sert C, Altindag O, Sirmatel F. Determination of basal metabolic rate and body composition with bioelectrical impedance method in children with cerebral palsy. *J Child Neurol* 2009;24:237–40.
25. Marra M, Pasanisi F, Montagnese C, De Filippo E, De Caprio C, De Magistris L, Contaldo F. BMR variability in women of different weight. *Clin Nutr* 2007;26:567–72.
26. Rising R, Lifshitz F. Lower energy expenditures in infants from obese biological mothers. *Nutr J* 2008;16:7–15.
27. Baracos VE. Hypercatabolism and hypermetabolism in wasting states. *Curr Opin Clin Nutr Metab Care* 2002;5:237–9.
28. Lee HS, Kang TG, Kim JJ, Yu JH, Han KS, BAe HS, et al. A case report about the Taeyangin Hae Yuk with Yul Gyuk syndrome due to her work stress. *J Sasang Constitutional Med* 2006;18:185–94.
29. Kin KY, Lee SY, Jung SM, Cha JD. A case report of interior disease of Taeyangin. *J Sasang Constitutional Med* 2002;14:181–7.
30. Buscemi S, Verga S, Caimi G, Cerasola G. A low resting metabolic rate is associated with metabolic syndrome. *Clin Nutr* 2007;26:806–809.
31. Olive JL, Ballard KD, Miller JJ, Milliner BA. Metabolic rate and vascular function are reduced in women with a family history of type 2 diabetes mellitus. *Metabolism* 2008;57:831–7.
32. Chen R, Moriya J, Yamakawa JI, Takahashi T, Kanda T. Traditional Chinese medicine for chronic fatigue syndrome. *eCAM* Advance Access published February 27, 2008, doi:10.1093/ecam/nen017.
33. Yi YD, Chang IM. An overview of traditional Chinese herbal formulae and a proposal of a new code system for expressing the formula titles. *eCAM* 2004;1:125–32.
34. Firenzuoli F, Gori L. Herbal medicine today: clinical and research issues. *eCAM* 2007;4(Suppl 1):37–40.
35. Zanger UM, Turpeinen M, Klein K, Schwab M. Functional pharmacogenetics/genomics of human cytochromes P450 involved in drug biotransformation. *Anal Bioanal Chem* 2008;392:1093–108.
36. Kim JY, Kim KY. A research on the classification of herbal medicines based on the Sasang constitution (Soeumin Part). *J Sasang Constitutional Med* 2001;13:8–16.
37. Kim JY, Kim KY. A research on the classification of herbal medicines based on the Sasang constitution (Soyangin Part). *J Sasang Constitutional Med* 2001;13:1–7.
38. Kim JY, Kim KY. A research on the classification of herbal medicines based on the Sasang constitution (TaeEumin and TaeYangin Part). *J Sasang Constitutional Med* 2002;14:1–9.
39. Liu CY, Tseng A, Yang S. *Chinese Herbal Medicine: Modern Applications of Traditional Formulas*. New York: CRC Press, 2005.
40. Kim SH, Lee SR, Do JH, Lee SK, Lee KS. Effects of Korean red Ginseng and Western Ginseng on body temperature, pulse rate, clinical symptoms and the hematological changes in human. *Korean J Ginseng Sci* 1995;19:1–16.
41. Kim SJ, Kim HJ, Ko BP, Kim HD, Kim JA, Park JM, et al. Effect of Ephedra Sinica and Evodia Rutaecarpa on resting metabolic rate in obese premenopausal women during low-calorie diet: a randomized controlled clinical trial. *J Korean Orient Assoc Study Obes* 2004;4:45–54.
42. Hsing LC, Yang CS, Lee TH, Kim LH, Kwak MJ, Seo ES, et al. Short-term effect of Mahuang on state-trait according to Sasang constitution classification: a double-blind randomized controlled trial. *Korean J Orient Int Med* 2007;28:106–14.
43. The International HanMap Consortium. A haplotype map of the human genome. *Nature* 2005;437:1299–1320.
44. Ginsburg GS, McCarthy JJ. Personalized medicine: revolutionizing drug discovery and patient care. *Trends Biotechnol* 2001;19:491–496.
45. Ha MS, Ko BH, Song IB. A study on the correlation between Sasang constitution and HLA type. *J Sasang Constitutional Med* 2002;14:90–9.
46. Han SK, Chi SE, Choi SM. Study on the analysis of constitutional genes by HLA typing. *J Sasang Constitutional Med* 2001;13:97–103.
47. Patwardhan B, Joshi K, Chopra A. Classification of human population based on HLA gene polymorphism and the concept of Prakriti in Ayurveda. *J Altern Complement Med* 2005;11:349–53.
48. Patwardhan B, Bodeker G. Ayurvedic genomics: establishing a genetic basis for mind-body typologies. *J Altern Complement Med* 2007;14:571–6.
49. Chen S, Lv F, Gao J, Liu Z, Fu Y, et al. HLA Class II polymorphisms associated with the physiologic characteristics defined by traditional Chinese medicine: linking modern genetics with an ancient medicine. *J Altern Complement Med* 2007;13:231–9.
50. Shim EB, Lee SW, Kim JY, Earm YE. Physiome and Sasang constitutional medicine. *J Physiol Sci* 2008;58:433–40.

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