

SHENG MAI FORMULA *SHENG MAI SAN*

ORIGINS: Zhang Yuan-su, *The Origins of Medicine* (Yi Xue Qi Yuan) 1186.

Sheng Mai Formula (*Sheng Mai San*) was made famous during the Yuan Dynasty (1271-1368 C.E.) and has often been thought to originate from that period. Zhu Dan-xi and Li Dong-yuan (Li Gao), both Yuan Dynasty physicians, mention *Sheng Mai San* in their writings, but the formula can be traced back at least to Zhang Yuan-su's book *The Origins of Medicine* (Yi Xue Qi Yuan) from 1186.

GENERAL SIGNS/SYMPTOMS

As is implied in the formula's name, *Sheng Mai*, or "Generate the Pulse," a damaged pulse quality is a common feature in every presentation for which this formula has classical application. In every instance of classical use, the pulse will reflect some stage of depletion from damage to qi and body fluids. The damage results from heat in the lungs leading to scorched lungs, excessive sweating, or both. Common signs and symptoms include spontaneous sweating, dry mouth and thirst, chronic, weak cough, and possibly blocked urination. In the modern era, the formula has shown to be especially useful for treating a wide range of cardiovascular conditions. It can thereby be thought of as treating a variety of deficiency issues of the upper warmer, where qi and yin or fluids are both compromised.

CLASSICAL APPLICATIONS

1. Qi and yin deficiency of the lung w/ latent heat

- Chronic, weak cough
- Spontaneous sweating
- Shortness of breath
- Mild fever
- Dry mouth with thirst
- Empty, fine, or thready pulse

2. Summerheat

(use after high fever has subsided)

- Dry mouth and thirst
- Scanty urination
- Irritability
- Lethargy
- Possible shortness of breath
- Large, forceless pulse or fine, empty and rapid

3. Yang qi exhaustion/ collapse (severe qi and fluid damage from warm disease)

- Large, scattered pulse
- No thirst, or desire for warm fluids

4. Strengthens the "upper source of water"

- Scant or blocked urination
- Spontaneous sweating
- Dry mouth w/ thirst
- Thin, weak pulse

INGREDIENTS

PINYIN	LATIN	ENGLISH	PERCENT OF FORMULA
<i>Ren Shen</i> (Chief)	Ginseng (radix)	Asian Ginseng Root	37.5%
<i>Mai Men Dong</i> (Deputy)	Ophiopogonis (radix)	Ophiopogon Tuber	37.5%
<i>Wu Wei Zi</i> (Assistant)	Schisandrae (fructus)	Schisandra Fruit	25.0%

GENERAL INDICATIONS / MODERN APPLICATIONS

Altitude sickness	Cough, chronic weak	Myocardial infarction (recovery from)
Alzheimer's disease	Diabetes mellitus	Myocarditis, viral
Angina pectoris	Dizziness due to low blood pressure	Palpitations
Anxiety	Dyspnea	Post-bypass (recovery phase)
Arrhythmia	Forgetfulness	Pulmonary tuberculosis (adjunct therapy)
Asthma, chronic	Hemorrhagic and/or cardiogenic shock	SARS (recovery phase)
Breath, shortness of	Hyperthermic shock	Shock, acute
Bronchitis, chronic	Hypotension	Rheumatic heart disease
Cerebral infarction	Infertility	Urination dark and scanty caused by excessive sweating
Chemotherapy support	Insomnia	Vertigo from low blood pressure
Congestive heart failure	Leukopenia	
Coronary artery disease		

FORMULA ACTIONS

- Tonifies qi
- Boosts *zong qi*
- Nourishes yin
- Engenders fluids
- Astringes yin and body fluids
- Constrains lung qi

TONGUE

Dry, thin tongue, with little or no coating.

PULSE

Empty, fine or thready, possibly rapid.

Large and forceless (in acute summerheat).

Large and scattered (yang qi exhaustion with severe damage to qi and body fluids).

CONTRAINDICATIONS / CAUTIONS CLASSICAL

This formula is contraindicated during the acute phase of febrile disease or any external pathogenic attack. Use with caution in cases of cough due to damp-phlegm or phlegm-heat or when there has been no damage to body fluids. Avoid long term use in cases of severe spleen and/or kidney deficiency.

MODERN

Due to the presence of ginseng (*ren shen*), this formula is contraindicated for those with hypertension from excess.

DOSAGE

The standard adult dosage is 2 tablets, 3 times daily.

SYNERGY OF INGREDIENTS

There is no question that the role of chief in **Sheng Mai Formula** is fulfilled by ginseng (*ren shen*). Alone, ginseng (*ren shen*) strongly supplements the source qi, tonifies lung and spleen, engenders fluids, and has the ability to rescue the yang qi from collapse. It has the ability to calm *shen* (spirit), and can therefore address issues such as irritability, anxiety, and insomnia when caused by deficiency.

The deputy herb, ophiopogon (*mai men dong*), is one of the primary substances in the *Materia Medica* for nourishing yin and generating body fluids. It is especially useful in cases of qi deficiency, since it is only mildly cloying, and therefore easier to digest and utilize than some of the other substances in its class. Ophiopogon (*mai men dong*) nourishes yin in all the organs of both the upper and middle warmers. Because it is slightly bitter and slightly cold, it has the ability to mildly clear heat in the heart, lungs, and stomach. The combination of ginseng (*ren shen*) and ophiopogon (*mai men dong*) is the strongest known for restoring depleted fluids.

Schisandra (*wu wei zi*) is the assistant in this formula. It is best known for its ability to astringe leakage of qi, sweat, and essence. In **Sheng Mai Formula**, schisandra (*wu wei zi*) assists by virtue of its ability to check the loss of body fluid through sweat, and contain the lung qi. It also shares the actions of the other two substances to calm *shen* (spirit) and generate body fluids. In addition, schisandra (*wu wei zi*) nourishes the kidney and helps it to grasp the qi of the lung. This action helps to descend rebellious lung qi and control cough.

ANALYSIS OF CLASSICAL INDICATIONS**Qi and Yin Deficiency of the Lung, with Latent Heat**

Sheng Mai Formula (*Sheng Mai San*) was originally developed by Zhang Yuan-su, and published in the *Origins of Medicine* in 1186. The formula was used to treat a condition where the pulse “threatens to be cut off.”ⁱ The specific pattern was a post-infectious condition wherein heat had damaged the qi and yin of the lung and some residual heat remained. Continued loss of fluids through sweat further damages the qi, which relies upon the yin to anchor it. The weakness of the qi and the lack of anchoring causes the yang to float upward. The pulse is therefore empty and fine, reflecting the loss of qi (empty) and yin (fine). It is shrinking, and therefore “threatening to be cut off.” The chief symptoms for this condition are chronic, weak cough with spontaneous sweating and a deficient pulse. There may also be shortness of breath or dry mouth with thirst. The tongue will usually present as dry with little or no coating.

The deficient pulse is usually empty/forceless and may also be rapid if the latent heat is aggravating the condition or if the initial external pathogen still has presence in the lung. Once there has been sufficient fluid loss, the pulse will present as empty and fine or thready.

This application of the formula places it in the realm of rescue tonic. The condition can continue to degenerate, if not corrected, because the symptoms of the condition also advance it. That is to say: the yin deficiency continues to stimulate a persistent cough, which in turn contributes to the consumption of yin and the leakage of lung qi. As the lung qi deficiency progresses, the *wei* qi (defensive qi) is also damaged and is unable to protect the exterior and to coordinate with the *ying* qi to regulate the opening and closing of the pores, causing spontaneous sweating and further loss of yin. This formula acts to boost the *yuan* qi that in turn boosts the *zong* (qi of the chest) and *wei* qi. The astringent quality of the formula helps to contain the lung qi, protect it from further damage, and retain fluids to prevent further loss and damage to yin from the spontaneous sweating. All herbs in the formula have the ability to moisten and nourish the *jinye* (body fluids). They replenish the lost fluids and restrain them from further leakage.

Summerheat

Li Dong-yuan (Li Gao) was a disciple of Zhang Yuan-su. He extended the application of his teacher's formula to treat damage from summerheat. Summerheat is the result of over-exposure to environmental heat, causing high fever, thirst, scanty urination, and heart vexation. ("Sunstroke" and "heatstroke" are modern names for conditions that fall under the category of "summerheat.") The pulse may present as large and forceless (early stage) or fine, empty and rapid (in the later stages). **Sheng Mai Formula** (*Sheng Mai San*) is too tonifying to apply while the fever is still high. For the febrile stage, use White Tiger Decoction (KPC 1090 *Bai Hu Tang*). Once the fever is under control, **Sheng Mai Formula** (*Sheng Mai San*) should be used to facilitate recovery by restoring qi and yin and rectifying the pulse.

Yang Qi Exhaustion/Collapse

The *Wen Bing* school recommends using **Sheng Mai Formula** (*Sheng Mai San*) to treat yang collapse when a warm disease has caused considerable damage to the source qi (Wu Ju-tang, 1798). This is similar to Zhang Yuan-su's original application, but the indicated damage is more severe. True yang qi collapse is a life-threatening condition, but the patient needn't be on the brink of death in order for **Sheng Mai Formula** (*Sheng Mai San*) to be useful. The formula can be used when yang qi exhaustion is apparent. Yang qi exhaustion (also called "deficiency desertion" or "vacuity desertion") is the gradual, yet critical, depletion of yang qi from prolonged illness. The pulse will first become thin and empty, but will later become larger, floating, and forceless as the yang begins to separate.

Strengthen the "Upper Source of Water"

"The lung is the upper source of water," (*"Fei wei shui zhi shang yuan."*) In his *Discussion of Blood Patterns* (Xue Zheng Lun, 1884), Tang Zong-hai encourages use of **Sheng Mai Formula** (*Sheng Mai San*) to supplement the yin and qi of the lung in order to facilitate its role as "the upper source of water." Of the three water sources in the body, one in each of the three warmers (*sanjiao*), the lung's function is related to its role as "governor of qi". Moisture follows the qi commanded by the lung in the same way that mist follows a river. One aspect of the lung's "upper source of water" role is to distribute this "mist" (an aspect of yin qi) through the body to nourish all tissues. Another aspect of the lung as a water source is that it conducts used water to the lower warmer, via the triple warmer waterways. Once in the lower warmer, the water comes under the command of the kidney. "Strengthening the upper source of water" is a treatment for chronic weakness and clumped dryness. There is an uneven moistening from the deficient lungs. There may be patches of dry skin, scanty urination, a weak chronic cough, spontaneous sweating, dry mouth, and thirst. The pulse will be thin and weak.

MODERN APPLICATIONS

A wide variety of modern applications of **Sheng Mai Formula** (*Sheng Mai San*) have been verified by research. These applications fall in three main categories: pulmonary, cardiac, and circulatory system diseases.

Pulmonary Diseases Due to Lung Qi and Yin Deficiency

The resulting lung qi and yin deficiency caused by second stage pulmonary tuberculosis (TB) can be treated by **Sheng Mai Formula** (*Sheng Mai San*). This stage of TB is characterized by a chronic, severe cough and shortness of breath that leads to further weakening of the lung and diaphragm muscles. The second stage of a TB infection is a cell mediated immune response to the initial pathogen.ⁱⁱ Ginseng (*ren shen*), the chief herb, is known to be an immune stimulant. This formula should **not** be used during the initial inflammatory stage of the disease.

Some forms of chronic bronchitis may be successfully treated with **Sheng Mai Formula** (*Sheng Mai San*). The underlying lung qi and yin deficient pattern may arise from aging or weak constitution, but may also have developed from smoking or other exposures. This formula should be given as a tonic when the patient has **no** bronchial infection in order to strengthen the lung qi and yin in order to resist further depletion. The patient should discontinue use when an external pathogen is present.

Chronic asthma may be treated with **Sheng Mai Formula** (*Sheng Mai San*) if the patient presents with lung qi and yin deficiency. **Sheng Mai Formula** (*Sheng Mai San*) would be used in between the acute attacks to tonify and astringe the lung qi, if there are no signs of pathogenic invasion at the time. The goal is to lessen the severity and frequency or eliminate the acute attacks by building the lung qi and yin.ⁱⁱⁱ

The outbreak of Severe Acute Respiratory Syndrome (SARS) in China in 2003 created the need for new herbal protocols for treating this previously unknown disease. SARS has several distinct stages, and, depending on the individual, can have

slightly different presentations. The initial stage was usually marked by the presence of damp-heat toxin obstructing lung function. Prior to the term SARS being coined, the pattern was being diagnosed as “atypical pneumonia.” The treatment focused on clearing the toxic, damp-heat pathogen and transforming dampness to move the obstruction and disseminate the lung qi. In a small number of patients, during the peak phase of the infection, the heat pathogen would enter the *ying* (nutritive) and *xue* (blood) levels. When this happened, **Sheng Mai Formula** (*Sheng Mai San*) would be combined with Clear the Nutritive Level Decoction^{iv} (*Qing Ying Tang*). Doctors would also often prescribe **Sheng Mai Formula** (*Sheng Mai San*) during the recovery stage of SARS to speed recovery and prevent life-long effects from the damage.^v

Cardiovascular System—Heart and Lung Qi Deficiency and Yang Qi Collapse

In spite of the formula’s origins and its frequent application in pulmonary conditions, the most well known modern applications for this formula are cardiovascular. There are numerous studies to support the following benefits of **Sheng Mai Formula** (*Sheng Mai San*) for cardiovascular disease.

Sheng Mai Formula (*Sheng Mai San*) strengthens cardiac contractility,^{vi} reduces oxygen consumption in the heart muscles,^{vii} adjusts blood pressure, protects against shock, expands the coronary arteries, and increases arterial blood flow in the heart.^{viii}

Sheng Mai Formula (*Sheng Mai San*) is commonly used in hospitals in China to treat emergency situations such as cardiogenic, hemorrhagic shock, hyperthermic shock, septic shock, or congestive heart failure.^{ix} An intravenous form of the formula, *Shengmai Zhushenye*, which is a combination of ginseng (*ren shen*) and ophiopogon (*mai men dong*)—sometimes excluding schisandrae (*wu wei zi*)—is most commonly used for these types of shock.

Arrhythmia and heart palpitations due to heart and/or *zong qi* deficiency can be successfully treated with **Sheng Mai Formula** (*Sheng Mai San*).

^{xi} For chronic hypotension, a standard dosage of the classic formula is appropriate. Cardiac, septic,

hemorrhagic, hyperthermic or hypothermic shock, with an immediate danger of yang qi collapse would be treated with an IV formula of *Shengmai Zhushuye*.^{xii}

One of the undesirable risks connected with chemotherapy treatments for breast, colon, and pancreatic cancer is adriamycin-induced cardiac damage. **Sheng Mai Formula** (*Sheng Mai San*) may be used to mediate this risk.^{xiii} Other side effects of chemotherapy, such as a decrease in white blood cell count (leukopenia) may be improved with **Sheng Mai Formula** (*Sheng Mai San*). Also, the incidence and severity of ulcerative stomatitis, a common side effect of chemotherapy treatments, may be reduced with the use of this formula.^{xiv}

Sheng Mai Formula (*Sheng Mai San*) has been used for many generations in Chinese medicine to treat coronary artery disease. **Sheng Mai Formula** (*Sheng Mai San*) has been shown to decrease incidence of cardiac failure, increase cardiac output and contractility. Research has shown that **Sheng Mai Formula** (*Sheng Mai San*) can protect against the incidence of heart attack. Use of the formula during an infarct can reduce the size and severity of a myocardial infarction through the activation of protein kinase C and opening of the mitochondrial KATP channels.^{xv} Recovery from coronary bypass surgery is yet another application of this extraordinary formula. The ability to strengthen cardiac contractility, expand the coronary arteries (thus increasing oxygen flow and arterial blood flow) is essential in the healing process and rejuvenation of the heart muscle after surgery.

Sheng Mai Formula (*Sheng Mai San*) has been shown to be an effective protection for altitude/mountain sickness by increasing blood oxygen transport when the subject is relocated to significantly higher altitudes.^{xvi} A test was conducted on humans and animals using declining levels of atrial sodium-peptide as an indicator for declining blood oxygen transport. Both animals and humans improved with these markers when they took **Sheng Mai Formula** (*Sheng Mai San*) for five days prior to their relocation to a higher altitude.

Circulatory System

The ability of **Sheng Mai Formula** (*Sheng Mai San*) to increase cardiac contractility and expand coronary arteries as well as the oxygen and blood flow to the coronary arteries is the primary reason that this formula has such an extraordinary effect not only on the heart itself, but also the circulatory system.

The action of boosting the heart yang qi also has a positive effect on fertility. One pattern of infertility involves the failure of heart yang qi to spark the kidney, *ren* and *chong* channels to initiate and maintain the regularity of the menstrual cycle, including the release of the egg during ovulation. A study published in 1996, showed that **Sheng Mai Formula** (*Sheng Mai San*) was effective in treating infertility due to anovulation.^{xvii}

Sheng Mai Formula (*Sheng Mai San*) has also been shown to have many immuno-supportive effects to enhance cellular immune functions. Building white blood cells and natural killer cells is one function.^{xviii} Increasing proper elimination of “blood wastes” through phagocytosis is another immune boosting effect of **Sheng Mai Formula** (*Sheng Mai San*).^{xix}

FORMULA COMPARISONS

Sheng Mai Formula and Eight Immortals Formula

Even though both of these formulas treat qi and lung yin deficiency, it is important to differentiate further to apply the correct formula. The focus of **Eight Immortals Formula** (*Ba Xian Chang Shou Wan*) is to nourish the yin of the lung and kidneys. It does not tonify the lung qi, so much as it prevents further loss of lung qi and yin with the inclusion of schisandra (*wu wei zi*). The pulse in the **Eight Immortals Formula** (*Ba Xian Chang Shou Wan*) pattern is thin and possibly rapid, but is not necessarily empty, as it would be in the pattern treated by **Sheng Mai Formula** (*Sheng Mai San*). This is because a **Sheng Mai Formula** (*Sheng Mai San*) pattern has marked lung qi deficiency, not a necessary component of the **Eight Immortals Formula** (*Ba Xian Chang Shou Wan*) pattern.

Accompanying signs and symptoms of the **Eight Immortals Formula** (*Ba Xian Chang Shou Wan*) pattern may include constipation, hemoptysis, and night sweats, to name a few. **Sheng Mai Formula** (*Sheng Mai San*) is more appropriate in cases where qi deficiency, either in the form of lung qi and/or *yuan* qi deficiency is the primary symptom. There may also be deficiency heat signs from lung yin deficiency, primarily dryness in the form of thirst; dry tongue; thicker, difficult to expectorate sputum and qi deficiency symptoms including: weakness, fatigue, shortness of breath, palpitations, and spontaneous sweating.

Sheng Mai Formula and Lily Preserve Metal Formula

Lily Preserve Metal Formula (*Bai He Gu Jin Tang*) includes American ginseng (*xi yang shen*) instead of Asian ginseng (*ren shen*). American ginseng cools while it tonifies, and is therefore more appropriate while heat still lingers in the lungs. Lily bulb (*bai he*) itself is efficient at clearing heat out of the lungs. Symptoms that may be treated by **Lily Preserve Metal Formula** (*Bai He Gu Jin Tang*) include; cough with blood and sputum, dry mouth, lips, cough, or nose; sore throat from dryness, night sweats and five palm heat. **Sheng Mai Formula** (*Sheng Mai San*) is more appropriate in cases where lung qi deficiency is as prominent or more prominent than the yin deficiency. Like **Eight Immortals Formula** (*Ba Xian Chang Shou Wan*), **Lily Preserve Metal Formula** (*Bai He Gu Jin Tang*) also treats lung and kidney yin deficiency with dryness. But **Lily Preserve Metal Formula** (*Bai He Gu Jin Tang*) is stronger to clear heat and resolve lingering phlegm in the lungs. **Lily Preserve Metal Formula** (*Bai He Gu Jin Tang*) is designed for the lingering, sub-acute phase of a warm upper respiratory disease. In fact, for treating post-illness, one might consider using **Lily Preserve Metal Formula** (*Bai He Gu Jin Tang*) just prior to **Sheng Mai Formula** (*Sheng Mai San*) in order to insure that the residual heat is cleared out before one begins to tonify.

Sheng Mai Formula and Restore the Lung Formula

These two formulas both help restore the lung qi after an illness has depleted it. **Restore the Lung Formula** (*Bu Fei Tang*), some think, is actually a modification of **Sheng Mai Formula** (*Sheng Mai San*), but the focus of **Restore the Lung Formula** (*Bu Fei Tang*) is more concentrated on stopping the cough. It contains prepared rehmannia (*shu di huang*) to help the kidneys grasp the qi of the lung, and two herbs that help to descend the lung qi and stop cough: aster root (*zi wan*) and white mulberry bark (*sang bai pi*). The cough may be more pronounced in the **Restore the Lung Formula** (*Bu Fei Tang*) pattern, but the condition of the pulse is more serious in the **Sheng Mai Formula** (*Sheng Mai San*) pattern.

Sheng Mai Formula, Blood Palace Formula, and San Qi Tablets

All three of these formulas can be used to treat coronary artery disease and angina pectoris. A key difference is that **Sheng Mai Formula** (*Sheng Mai San*) treats the vessels through the qi while the other two formulas focus on the blood itself. The mechanism of **Sheng Mai Formula** to expand the arterial walls, oxygenate the cardiac muscle, and improve cardiac contractility is all accomplished through supporting the *yuan* qi, lung and fluids. **Blood Palace Formula** (*Xue Fu Zhu Yu Tang*) and **San Qi Tablets** (*San Qi Wan*) relieve chest pain by moving blood and dispelling stasis, which will free the qi. **Blood Palace Formula** (*Xue Fu Zhu Yu Tang*) and **San Qi Tablets** (*San Qi Wan*) treat an excess of stagnation/stasis, while **Sheng Mai Formula** (*Sheng Mai San*) as a tonic, treats deficiency.

USEFUL COMBINATIONS

For coronary artery disease resulting from a combination of qi and blood deficiency (specifically lung or <i>yuan</i> or <i>zong</i> qi plus heart and/or liver blood deficiency)	Use with Tang Kuei & Salvia Formula.
For adjuvant cancer therapy, for relieving side effects of chemotherapy or to repair damage to the blood caused by chemotherapy and radiation	Use with Five Mushroom Formula.
For blood stasis, qi and yin deficiency found in aging, as well as to preserve yin, strengthen <i>zong</i> qi and regulating the heart and vessels	Use with Blood Palace Formula.

Endnotes

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- ^{xix}Ibid, Rong.

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