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Dietetics Soups

a continuing education course

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Authors

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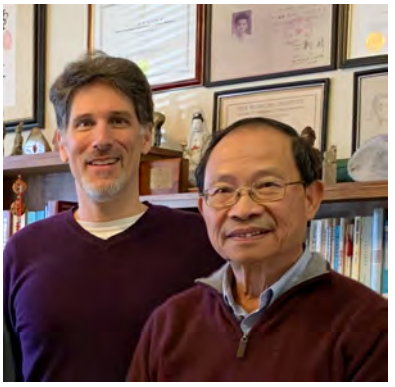

Adam L. White, L.Ac. and Prof. Jeffrey Pang, L.Ac.

Dietetics Soups

Course Content

This continuing education course is a multimedia experience with two major components. **This eBook is one component, the other is a video, please view the video at the following link:**

https://youtu.be/ZkKKXHj3ooQ

The following section is a guide to help clarify ingredients, cooking preparations, and medicinal functions covered in the video.

Two Soups & Ingredients

We start our dietetics journey in Prof. Jeffrey Pang's office, discussing the two soups to be reviewed. This section provides a guide to what you see in the video and helps to clarify topics covered in the preparation and cooking process.

Two soups are presented, Ba Wang Hua (霸王花) soup and Shan Yao soup. The Ba Wang Hua soup focuses on clearing heat & toxins, stopping coughing, and dissolving hot phlegm.

The Shan Yao (山藥) soup mildly tonifies the spleen and benefits digestion. Hei Mu Er (黑木耳, black fungus) can be added as one of the ingredients. Hei Mu Er adds a mild invigorate blood function. Notably, the Shan Yao soup is good for the treatment of weakness and is used to strengthen the body. The soup is also a good choice for strengthening the constitution of children, recovering from a dry cough or chronic illness, and balancing the body.

Phlegm Stagnation

If there is phlegm stagnation, Zhu Li (竹沥, bamboo sap) can be added to soups or any Pi Pa Gao (loquat-honey cough syrup). Alternatively, Tian Zhu Huang (天竺黄, bamboo secretion) can be added. However, Tian Zhu Huang is usually added to herbal decoctions and not used in dietetics applications.

Next, we look at individual ingredients and then cooking instructions for the soups.

Ba Wang Hua (霸王花)

This herb is soaked in water to rehydrate and soften, and later cooked. Ba Wang Hua is sweet and enters the lung and liver channels. Ba Wang Hua (also called Jian Hua, Ba Huang Hua, Hylocereus undatus, Flos Hylocerus flower) dissolves hot phlegm nodules under the skin, which makes it appropriate for the treatment of swollen glands, lymph, and tonsils. Ba Wang Hua clears heat and toxins and moistens lung yin.

Ba Wang Hua is sometimes called lily flower or aloe flower, which are strictly colloquial associations and are not specific and accurate to the source of this plant.

Shan Yao (山藥, Chinese yam)

Shan Yao is sweet and neutral. It enters the kidney, lung, and spleen channels. Shan Yao tonifies the qi of the spleen, stomach, and lungs. Shan Yao tonifies lung and kidney yin. The variety depicted here is a culinary variety. In the herb clinic, the variety that we receive from herbal medicine suppliers is a thinner variety, which has a stronger tonify qi function.

Shan Yao in a soup with carrot

Loquat (Pi Pa)

The flesh of the loquat is sweet, sour, cooling, and enters the lung and stomach channels. Loquats moisten the lungs, promote jin ye, and alleviate thirst. Loquats are useful for the treatment of dry coughs. Although loquats have a mild function to regulate and descend stomach qi, they are generally not recommended for patients with spleen and stomach qi deficiency.

Loquat flesh may be eaten or consumed as a juice. Loquats are commonly included in syrups. Thick, viscous cough syrups may be found in the marketplace under the name Pi Pa Gao (sometimes spelled Pei Pa Koa) or loquat jelly. These often contain a combination of honey, loquat flesh, loquat leaf, lemon, mint, Chuan Bei Mu, Jie Geng, Yuan Zhi, and other herbs.

The Pi Pa (loquat) tree is indigenous to southeastern China. An easy home remedy for dry throat with coughing is to combine loquat

fruit with honey and mint. Additional herbs can be added to the mixture to enhance the therapeutic value.

Pi Pa Ye

Pi Pa Ye (loquat leaf) is bitter, cooling, and enters the lung and stomach channels. Pi Pa Ye dissolves hot phlegm, clears lung heat, and stops coughing. Pi Pa Ye descends stomach qi and therefore is used for the treatment of rebellious stomach qi with vomiting or nausea. If using Pi Pa Ye from your own tree, wash the leaves to remove the fine hairs from the leaves; they may be an irritant.

Mi Gao is a thick honey syrup with herbs added (Mi is honey and gao is a thick syrup, paste, or jelly). Pi Pa Gao is a common cough syrup and typically has pi pa ye (loquat leaf) with herbs such as Yuan Zhi and Xing Ren added to strengthen the stop coughing and dissolve phlegm functions. Another preparation is to boil loquat fruit, add stop coughing herbs, and then add a lot of honey to preserve the dietetics formula. The dual function of honey, to both preserve and add flavor, makes this syrup a valuable component of Chinese medicine dietetics.

Hei Mu Er (黑木耳, black fungus)
Bai Mu Er (银耳, white fungus)

Hei Mu Er

Bai Mu Er

Bai Mu Er (Yin Er, White Wood Ear, Fructificatio Tremellae Fuciformis, White Fungus) is sweet, bland, and neutral. Bai Mu Er

enters the lung and stomach channels and nourishes lung qi and yin. Hei Mu Er (Black Fungus, Auricularia Polytricha, Black Wood Ear Fungus) is sweet, bland, neutral, and enters the stomach and large intestine channels. Hei Mu Er nourishes and invigorates blood and has a mild function to nourish lung qi and yin.

Both fungi tonify qi, nourish yin, and generate fluids. Bai Mu Er more strongly nourishes lung qi and yin whereas Hei Mu Er invigorates blood. Bai Mu Er and Hei Mu Er are prepared in sweet dessert soups made with rock sugar. They are also common in savory entrees including stews, soups, and stir-fries.

Hei Mu Er has been shown to reduce cholesterol and triglycerides including significant reductions of LDL cholesterol.[1] Hei Mu Er inhibits platelet aggregation and thins the blood.[2] Another study notes that, "Administration of black fungus polysaccharides had significantly enhanced myocardium and blood antioxidant enzyme activities and reduced lipid peroxidation level in high fat mice. Our results indicated that black fungus polysaccharides could be beneficial for protection against cardiovascular diseases and its complications."[3] Hei Mu Er has also been shown to have anti-tumor properties.[4]

Yu Xing Cao (鱼腥草)

Yu Xing Cao is used for the treatment of lung heat, hot phlegm, and lung abscesses. It is especially useful for the treatment of coughing

[1]Byung-Keun Yang, Ji-Young Ha, Sang-Chul Jeong, Young-Jae Jeon, Kyung-Soo Ra, Surajit Das, Jong-Won Yun and Chi-Hyun Song. Hypolipidemic effect of an exo-biopolymer produced from submerged mycelial culture of Auricularia polytricha in rats. BIOTECHNOLOGY LETTERS. Volume 24, Number 16, 1319-1325.

[2]Hokama Y, Hokama JL. In vitro inhibition of platelet aggregation with low dalton compounds from aqueous dialysates of edible fungi. Res Commun Chem Pathol Pharmacol. 1981 Jan;31(1):177-80.

[3]Ma Jiangweia, Qiao Zengyong, and Xiang Xia. Optimization of extraction procedure for black fungus polysaccharides and effect of the polysaccharides on blood lipid and myocardium antioxidant enzymes activities. Carbohydrate Polymers. Volume 84, Issue 3, 17 March 2011, Pages 1061-1068.

[4]Mengyao Yu, Xiaoyan Xu, Yuan Qing, Xia Luo, Zhirong Yang and Linyong Zheng. Isolation of an anti-tumor polysaccharide from Auricularia polytricha (jew's ear) and its effects on macrophage activation. EUROPEAN FOOD RESEARCH AND TECHNOLOGY. Volume 228, Number 3, 477-485.

with hot phlegm. Fresh Yu Xing Cao can be added to soups. For flavor purposes, add Yu Xing Cao to soups when ready for serving. For concentrating the power of the herb, decoct the herb.

Xi Yang Cai (西洋菜, watercress)

Xi Yang Cai is cold, nourishes the lungs, alleviates constipation, and is valued for its significant nutritional and medicinal benefits. Xi Yang Cai is cooling and benefits kidney yin and also restores bodily fluids.

Xi Yang Cai is in the cabbage family and is a popular garnish in the USA. It is often served blanched or in soups throughout China. It is also cut and lightly sprinkled on salads. Xi Yang Cai is sometimes served freshly juiced with a little salt added. The juice is a helpful home remedy for the treatment of dry coughs or coughing with blood.

Cooking Xi Yang Cai in oil diminishes its medicinal functions. Xi Yang Chai combines well with dry or fresh figs, Mi Zao (honey date), Gou Qi Zi (lycium berry), and Chen Pi (aged citrus peel). It is spicy in its raw form but is mild and sweet when cooked. Watercress contains PEITC-NAC (N-acetylcysteine conjugate of phenethyl isothiocyanate) that has been shown to inhibit the proliferation of prostate cancer and tumorigenesis.[5]

Qing Luo Bo (daikon radish)

The daikon radish typically has either a white flesh or green flesh. Qing (green) Bo is more bitter than the white variety. Daikon is spicy, sweet, cooling, and enters the lung and stomach channels. Luo Bo benefits digestion and dissolves phlegm. Luo Bo breaks the qi and also breaks food stagnation.

- Fresh daikon juice (Luo Bo Zhi) benefits the lungs to treat coughing, coughing with phlegm, and other respiratory

[5]Jen Wei Chiao, Hongyan Wu, Gita Ramaswamy, C. Clifford Conaway, Fung-Lung Chung, Longgui Wang and Delong Liu. Ingestion of an isothiocyanate metabolite from cruciferous vegetables inhibits growth of human prostate cancer cell xenografts by apoptosis and cell cycle arrest. Oxford Journals, Life Sciences & Medicine, Carcinogenesis Volume 25, Issue 8 p. 1403-1408.

ailments. Lemon juice, mint, and honey can be added to enhance the medicinal benefits and to adjust the flavor.

- Fresh daikon juice with celery is a food treatment for high blood pressure.
- Cooked daikon radish, similar in function to daikon seeds (Lai Fu Zi, Luo Bo Zi), treats food stagnation and is beneficial for digestion disorders. The fiber content invigorates a sluggish stomach. Daikon is commonly prepared with tofu.
- White Tiger Soup or Green Dragon White Tiger Soup treats coughing, prevents the common cold & 'flu' and is particularly beneficial in the summertime to benefit the skin and for the treatment of acne. Make a soup with daikon and fresh green olives. Fresh olives can be substituted with He Zi or mung beans (Lu Dou) when they are not available. Mung beans are particularly beneficial for the treatment of skin conditions.
- Daikon radish is often pickled in Japanese cuisine.

Carrot (Red Carrot, Hong Luo Bo)

According to five elements principles, the red-yellow (orange) color combination reflects that carrots enter the heart and spleen channels. Carrots are sweet, neutral, tonify the qi and blood of the entire body, and benefit the ying qi (nutrition qi). Carrots benefit vision and treat night blindness.

Carrots have a similar shape and function to that of ginseng and are nicknamed "poor people ginseng." Carrots are rich in beta-carotene (a vitamin A precursor) and other carotenoids, vitamin C, B vitamins, iron, magnesium, phosphorus, calcium and potassium. Excess consumption of carrots may lead to carotenosis. Although benign and reversible, the skin turns orange for the duration of the illness.

- To tonify qi and blood, slice carrots and make a soup. Drink the soup and eat the carrots. Cooking makes the carrots easier to absorb.

- In the west, carrots are often juiced. The juicing method is cooling; however, cooking carrots in soup has the tonify function.

- Carrots reduce cholesterol and triglycerides. A 1997 study published in the American Journal of Clinical Nutrition notes, "Two hundred grams of raw carrot eaten at breakfast each day for 3 weeks significantly reduced serum cholesterol by 11%, increased fecal bile acid and fat excretion by 50%, and modestly increased stool weight by 25%. This suggests an associated change in bacterial flora or metabolism. The changes in serum cholesterol, fecal bile acids, and fat persisted 3 weeks after stopping treatment."[6]

Asian Pear (Xue Li)

[6]Robertson J, Brydon WG, Tadesse K, Wenham P, Walls A, Eastwood MA. The effect of raw carrot on serum lipids and colon function. Am J Clin Nutr. 1979 Sep;32(9):1889-92.

Xue means snow and Li refers to pear. Sometimes Asian pears are referred to as apple pears. The skin can be green, yellow, or white. A good quality Asian pear is juicy and crisp. Asian pears are sweet, cooling, and enter the lung and stomach channels. Asian pears nourish yin to promote the production of jin-ye (bodily fluids) and clear heat. The Asian pear treats dry coughs and moistens the lungs.

In Traditional Chinese Medicine clinics, the skin of the asian pear may be added to herbal formulas. Asian pear peels clear heat, lubricate the lungs, and produce jin-ye. They are useful for the treatment of summer heat and coughs.

Li Zhi, Asian pear juice, is especially helpful for children with a dry cough due to climactic dryness in the autumn. During cold weather, the use of home and office heating systems may cause dryness with heat in the air. Breathing dry heat causes a dry throat and coughing with blood. Eating Asian pears, Asian pear juice, and other yin foods are indicated.

Asian pears are helpful for the alleviation of chronic coughing, including chronic bronchitis. The following are healthy recipes for dryness contributing to chronic coughing:

- Crush Chuan Bei Mu and double boil it with Asian pear, Bai He, and water chestnut slices. Drink the soup and eat the Asian pear. Asian pear strengthens the function of the food treatment and makes the taste acceptable to children. This combination may be used in cases of hot phlegm stagnation in the lungs.

- Double boil Asian pear with Bai He and honey (Feng Mi, Mi Tang) or rock sugar (Bing Tang). Drink the soup and eat the Asian pear. Rock sugar is more cooling and moistening than brown sugar and is therefore the correct choice when opting for sugar. Bing Tang is made from refined sugarcane juice, it is hardened into large crystals. It is cool, sweet, and enters the lung, spleen, and stomach channels. Rock sugar moist-

ens and cools the Lungs and is used to treat dry-heat coughs. Rock sugar mildly tonifies spleen and stomach qi. Bing Tang is often prepared with Asian pears to nourish lung yin.

- Wu Zhi Yin (Five Juice Drink) moistens and tonifies yin. Use a juice machine and make a beverage from Asian pear, fresh lotus root, daikon, fresh water chestnut (replace with carrot, celery, or watercress if unavailable), and add honey.

  Regionally, there are several variations of the five ingredients. Conceptually, this drink is a fresh vegetable juice often containing herbal ingredients. Some preparations of Wu Zhi Yin are made from a combination of some or all of the following ingredients: fresh lotus root, fresh water chestnut, fresh Lu Gen, Mai Men Dong, daikon, and Asian pear. Freshness is important for juices. Packaged vegetable and fruit juice products involve more processing and possible additives, which may alter or diminish the function of the juice. Five Juice Drink, without honey, is beneficial for the treatment of diabetes related thirst and yin deficiency.

  Fresh lotus juice, Ou Zhi, is included to stop bleeding and tonify yin. It is often available in Asian supermarkets.

  Ma Ti (Chinese water chestnut) clears heat, promotes body fluids, and dissolves phlegm. It is sweet, cold, and enters the stomach, lung, and liver channels. It is used in Wu Zhi Yin (Five Juice Drink) for thirst due to heat and body fluid depletion but may also be combined with cucumber and tomato for a similar function.

  Watercress, Xi Yang Cai, has a strong cooling medicinal function. Watercress shares a similar name to that of American ginseng (Xi Yang Shen) because of its venerable medicinal properties. Watercress is considered to be a cancer preventative food. A recent study of tobacco smokers notes, “Watercress is a rich source of phenethyl isothiocyanate

(PEITC), an effective chemopreventive agent for cancers of the lung and esophagus induced in rodents by nitrosamines, including the tobacco-specific carcinogen 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone."[7]

Asian pears help to clear heat. Raw Asian pear or fresh Asian pear juice clears zang-fu heat. Cooked Asian pear functions more to tonify yin. To clear heat, use the following:

- Four Juice Drink: pear juice, watermelon juice, fresh sugar cane juice, raw Sheng Di Huang juice. If fresh Sheng Di Huang is unavailable, decoct Sheng Di Huang and add the tea to the juice. This juice strongly clears the heat and promotes jin ye (bodily fluids). This is appropriately used for exposure to heat in the summer and for dry coughs. Diabetics may drink this tea because the Sheng Di Huang moderates the sugars with its bitter qualities. The drink benefits diabetics, particularly with thirst due to upper jiao (burner) yin deficiency.

Apple (Ping Guo)

Characteristics of apples are revealed in its name, ping guo. Ping is translated as peaceful or neutral and guo is fruit. Apples have a neutral temperature and are mild. Peaceful and mild properties make apples a healthy choice for many people. Apples are sweet and slightly sour.

Apples are a healthy food and the following medicinal functions are very mild. Apples moisten the lungs, promote jin ye, and stop diarrhea. To stop diarrhea, a cooked preparation is most effective. Combine dried/dehydrated apple with Mai Ya and Chen Pi. Boil the combination and drink the tea. This is a common preparation well

[7] Effects of Watercress Consumption on Urinary Metabolites of Nicotine in Smokers, Stephen S. Hecht2, Steven G. Carmella and Sharon E. Murphy, Cancer Epidemiology, Biomarkers & Prevention October 1999 8; 907.

suited for children with indigestion, including constipation or diarrhea. The dehydrated apple imparts a stronger medicinal effect than raw apple.

Researchers from Cornell University (Ithaca, New York) at the Department of Food Science and Institute of Comparative and Environmental Toxicology note the following:

> Evidence suggests that a diet high in fruits and vegetables may decrease the risk of chronic diseases, such as cardiovascular disease and cancer, and phytochemicals including phenolics, flavonoids and carotenoids from fruits and vegetables may play a key role in reducing chronic disease risk. Apples are a widely consumed, rich source of phytochemicals, and epidemiological studies have linked the consumption of apples with reduced risk of some cancers, cardiovascular disease, asthma, and diabetes. In the laboratory, apples have been found to have very strong antioxidant activity, inhibit cancer cell proliferation, decrease lipid oxidation, and lower cholesterol. Apples contain a variety of phytochemicals, including quercetin, catechin, phloridzin and chlorogenic acid, all of which are strong antioxidants. The phytochemical composition of apples varies greatly between different varieties of apples, and there are also small changes in phytochemicals during the maturation and ripening of the fruit. Storage has little to no effect on apple phytochemicals, but processing can greatly affect apple phytochemicals.[8]

[8] Boyer, Jeanelle, and Rui Hai Liu. "Apple phytochemicals and their health benefits." Nutrition journal 3, no. 1 (2004): 5.

Soup Cooking Instructions

Shan Yao Soup

As we noted before, the Shan Yao (山藥) soup tonifies the spleen and benefits digestion. Notably, the Shan Yao soup is good for the treatment of weakness and is used to strengthen the body. The soup is also a good choice for strengthening the constitution of children, recovering from a dry cough or chronic illness, and balancing the body.

The total cooking and preparation time is approximately 30 minutes. Fill a pot with water and bring to a boil.

Take pork spare ribs and cut into cubes (about 6–8 cubes) with a clever. Spare ribs have a mild tonify property and therefore com-

bines well with the functions of Shan Yao. The use of spare ribs is for flavor. A vegetarian alternative to pork is the use of dried shitake mushrooms. Other meats can be used instead of spare ribs as well.

Cut a large culinary or medicinal variety of Shan Yao in half (half the length) to create a portion for cooking. Take the the half and remove the skin with a peeler. Rinse the Shan Yao with water. Finish peeling the Shan Yao under running water. Next, take the half piece of Shan Yao and cut in half again and then into large chunks (about 8 pieces).

Peel one carrot, wash, and cut into large pieces (about 8 pieces).

Optional: fill a small bowl with Hei Mu Er (黑木耳, black fungus). Rinse in a small bowl or basin. If adding Hei Mu Er, the Shan Yao soup will have a mild invigorate blood function.

Take half of an apple and peel. Slice about 4–6 pieces from the half apple. Cut an Asian pear similarly if using an Asian pear instead of apple.

Additional Options: one option is to add Dang Shen or Huang Qi for a stronger tonify function. The Dang Shen can remain in the soup and can be eaten; however, the Huang Qi must be discarded after cooking. Bai Mu Er is another option for more of a tonify lung yin function. These are options but are not necessary.

Put the spare ribs into the pot of boiling water. A few minutes later, add the apple pieces, then carrot, and cover. Optionally, add Hei Mu Er.

Allow the water to return to a low boil or simmer, add the Shan Yao, and cover the pot. Boil for approximately 10–15 more minutes. The Shan Yao should soften but not become mushy. Check the Shan Yao for softness by removing a piece and squeezing it with chopsticks. Once soft, remove the pot from heat and serve.

Ba Wang Hua Soup

Ba Wang Hua soup focuses on clearing heat & toxins, stopping coughing, moistening the lungs, and dissolving hot phlegm. This is appropriate for coughing with sore throat or fever. Some nicknames and labels in markets say things like aloe flower, dried Da Wang flower, and similar packaging labels.

In a bowl, soak the Ba Wang Hua (霸王花) for one hour to soften the dried herb. Empty the water from the bowl fill it again with fresh water. Remove the Ba Wang Hua, rinse, and squeeze out the water. Cut the pork spare ribs into cubes (about 8 cubes). Rinse a small bunch of watercress.

Bring water to a boil in a pot.

Once boiling, the first ingredient added to the water is Xing Ren. Add a small amount of Xing Ren to the soup to enhance its ability

to stop coughing. Use care to utilize only a small amount of Xing Ren to avoid toxicity. Follow licensed acupuncturist clinical precautions at all times when using herbs.

Next, add two pieces of Mi Zao (honey date) to sweeten and moisten the lungs to address coughing. Cover the pot and return to a low boil or simmer.

Add the spare rib cubes and cover the pot.

Boil for 5 minutes with the cover on. Next, add the Ba Wang Hua and cover again. Low boil or simmer for another 5–10 minutes, add the watercress, and cover the pot. Simmer for an additional 5–10 minutes. If the water is too low, it is OK to add a little more water to the pot and continue the simmer.

Options: add Pi Pa Gao or Zhu Li for a stronger function. Another option is to add daikon because the break the qi function helps with controlling phlegm.

Tea

Shen Nong, the Divine Farmer, is credited with discovering tea as an antidote to 72 poisons in approximately 200 BCE. Tea is made from the leaves, buds, and internodes of the Camellia sinensis plant. Special preparations may also be made from the twigs of the plant. The tea plant is indigenous to Asia and is typically clipped to form shrubs under two meters in height. The two major varieties are Camellia sinensis sinensis and Camellia sinensis assamica. Camellia sinensis sinensis grows throughout China and reaches a height of up to 3 meters, unclipped. The Assam variety (Camellia sinensis assamica) grows primarily in North-East India, Myanmar, Vietnam, and South China. Assam tea plants reach up to 20 meters in height, unclipped.

Portuguese explorers were introduced to tea in the Macau region in the 1500s. The Portuguese explorers adopted the local pronunciation of tea, later becoming what is now the current English pronunciation of tea. The Mandarin pronunciation of tea is cha.

Tea is bitter and sweet. Green tea is cold or cooling whereas black tea is warming. Tea enters the Heart, Lung, Stomach, Large Intestine, Small Intestine and Urination Bladder channels. Tea clears the upper jiao Shen (spirit) and therefore clears the mind and treats headaches. In the middle jiao, tea benefits the digestion of food and relieves food stagnation. In the lower jiao, tea promotes urination and bowel movements. Green tea's cooling nature makes it suitable for flushing out toxins in cases of urinary tract infections.

Tea is commonly available in white, green, brown, and black preparations. White tea is made from the new buds and young leaves of several varieties of the tea plant. This new growth maintains a silvery white appearance and is a specialty of Fujian province. Green tea, Lu Cha, is made from more mature leaves, buds, and internodes. Green tea and white tea maintain their green and white appearances because the freshly picked tea is steamed or heated and dried to prevent it from withering into a darker color.

Steaming or heating the tea inactivates polyphenol oxidase thereby halting the process of oxidation. It is best not to start the day with a cup of green tea prior to eating in order to prevent stomach irritation.

The withering process of tea into darker varieties is due to enzymatic oxidation, however, the term fermentation is often used. Fermentation is an industry term usually referring to oxidation levels and is not related to the chemical process of fermentation. Many refer to green and white tea as unfermented, oolong tea as partially fermented, and black tea as fermented tea.

Brown teas, such as many forms of oolong tea, get their earthy brown color because they are allowed to wither for a longer duration prior to steaming or heating. Tie Guanyin (Ti Kuan Yin) and Dong Ding are popular varieties of oolong tea. Black teas undergo the longest periods of oxidation prior to processing and therefore wither into the darkest colors. Red tea, Hong Cha, is the Chinese term for black tea and is named after the reddish color of tea when consumed as a drink.

English Tea

The English tradition of tea with milk has its origins in Tibet. The Tibetans are known for drinking butter tea (Po Cha, Su You Cha). Butter tea is a combination of tea, yak butter, and salt. This preparation is a high-energy drink that is helpful for Tibetans living at high elevations with cold temperatures and poor growing conditions. The English adapted the tradition of mixing black tea with dairy and added sugar. Adding dairy products and sugar strengthens the warming and tonifying function of the tea. Black tea is warming and is therefore more suitable for colder climates or consumption in the winter. Green tea is cooling and is more suitable for consumption in the summer.

Pu-erh

Pu-erh tea is made from a large leaf variety of Camellia sinensis, primarily grown in the mountains of Yunnan province. It is often pressed into bricks but is also available in loose-leaf form after completing a special process of pressing. The special preparations involved in Pu-erh production allow the tea to mature with age. Unlike other teas, the flavor of pu-erh improves with age.

Pu-erh, like many forms of tea, is known for its antioxidant properties. This is due in part to the presence of catechins and flavonoids in the tea.[9] Pu-erh has the special ability to raise the 'good' HDL cholesterol while lowering levels of the 'bad' LDL cholesterol.[10]

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[9]Pin-Der Duh, Gow-Chin Yen, Wen-Jye Yen, Bor-Sen Wang, and Lee-Wen Chang. Effects of Pu-erh Tea on Oxidative Damage and Nitric Oxide Scavenging. J. Agric. Food Chem., 2004, 52 (26), pp 8169–8176.

[10]Kuan-Li Kuo, Meng-Shih Weng, Chun-Te Chiang, Yao-Jen Tsai, Shoei-Yn Lin-Shiau, and Jen-Kun Lin. Comparative Studies on the Hypolipidemic and Growth Suppressive Effects of Oolong, Black, Pu-erh, and Green Tea Leaves in Rats. J. Agric. Food Chem., 2005, 53 (2), pp 480–489.

Research shows that pu-erh tea reduces obesity. The study conducted by the Yunnan Provincial Key Laboratory and the College of Food Science and Technology at the Yunnan Agricultural University notes that pu-erh significantly reduced total body weight, adipose pads, LDL cholesterol, and triglycerides.[11] The researchers postulate that the fat reduction may be triggered by pu-erh's ability to boost enzymes such as lipoprotein lipase, hepatic lipase, and hormone sensitive lipase. Pu-erh tea is a traditional compliment to mooncake during the Mooncake Festival (Mid-Autumn Festival). The properties of pu-erh make it well suited to improving digestion when eating oily, fatty, and sweet foods.

Decorative pressed tea ball preparations of pu-erh are made by combining it with Ju Hua (chrysanthemum) or other herbs. The tea balls expand when placed in hot water and often provide a beautiful presentation of the tea. Another special preparation involves cooking the pu-erh inside bamboo to enhance the flavor.

Herbs and Tea

Tea is also a term used in reference to herbal drinks that do not contain any part of the tea plant. Hua Cha, flower tea, is often made from jasmine, chrysanthemum (Ju Hua), and roasted Chinese rosebud (rosa rugosa, Mei Gui Hua).

In Chinese medicine, the opening of flowers is the expression of the free flow of Qi. Consequently, flowers have the general property of treating Liver Qi stagnation. The relationship of flowers and the Liver Qi make flower tea an appropriate match for springtime, the season associated with the Liver.

Jiao Gu Lan (gynostemma pentaphyllum) is a leaf herb that can be prepared as a hot beverage. It is slightly bitter and is often mixed with Gan Cao (licorice) to add sweetness to the flavor. Jiao Gu Lan is often used for its adaptogenic medicinal value. Also, herbal

11Zhen-Hui Cao, Da-Hai Gu, Qiu-Ye Lin, Zhi-Qiang Xu, Qi-Chao Huang, Hua Rao1, Er-Wei Liu, Jun-Jing Jia, Chang-Rong Ge. Effect of pu-erh tea on body fat and lipid profiles in rats with diet-induced obesity. Phytotherapy Research. Volume 25, Issue 2, pages 234–238, February 2011.

ingredients are often added to tea such as Shan Zha (hawthorn berry) or bitter melon.

Caffeine

The caffeine in tea stimulates the heart and Shen (spirit). As a result, tea increases alertness. However, excessive consumption is over-stimulating. Excessive consumption may induce temporary tachycardia, insomnia or palpitations. Tea is not for everyone as it may cause unwanted side effects.

Fluoride

Tea absorbs fluoride into its leaves. There are approximately 0.5 to 9 mg of fluoride per liter of tea. Excessive tea drinkers may absorb too much fluoride. Cases have been documented where patients drank 1 to 2 gallons per day of tea for several decades. Non-tea drinkers commonly consume 2-3 mg of fluoride per day from toothpaste, food, and fluoridated water. The official EPA (Environmental Protection Agency, USA) recommendation is to add 0.7 mg of fluoride per liter of water when fluoridating water supplies. This suggests that water fluoridation may be inappropriate or unnecessary for tea drinking populations.

Tannins

Tannins lend an astringent taste and property to tea. Tannins have anti-bacterial properties. As a result, tea is a food treatment for minor bacterial dysentery, gastroenteritis, and dysentery. However, tea may irritate stomach ulcers. Pu-erh has less of a tendency to cause irritation than green tea.

Catechins and Theaflavin

Catechins are naturally occurring phenol antioxidants named after the herb Er Cha (acacia catechu). Catechins are flavanol monomers (a type of flavonoid) and are abundant in both Er Cha and tea. EGCG (epigallocatechin 3-gallate) is a well researched catechin found in tea, especially for its anti-cancer properties. Topical applications of EGCG inhibit cancer growth in UVB induced skin tumors.[12] EGCG has also been shown to inhibit tumor growth when taken internally.[13] EGCG and other monomeric catechins are most abundant in green and white tea because EGCG is converted into thearubigins in the enzymatic oxidation process of making black tea.

Theaflavin, most abundant in black tea, is antioxidative, antiviral, antibacterial and anti-inflammatory.[14] Theaflavin and catechins in green and black tea inhibit HIV. A recent study concludes that, "tea, especially black tea, may be used as a source of anti-HIV agents and theaflavin derivatives may be applied as lead compounds for developing HIV-1 entry inhibitors…."[15] Also, theaflavin has been shown to reduce focal cerebral ischemia injuries with its ability to protect neurons from cerebral ischemia.[16]

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[12] Yao-Ping Lu, You-Rong Lou, Jian-Guo Xie, Qing-Yun Peng, Jie Liao, Chung S. Yang, Mou-Tuan Huang, and Allan H. Conney. Topical applications of caffeine or epigallocatechin gallate (EGCG) inhibit carcinogenesis and selectively increase apoptosis in UVB-induced skin tumors in mice. PNAS. September 17, 2002 vol. 99 no. 19 12455-12460.

[13] Y D Jung, M S Kim, B A Shin, K O Chay, B W Ahn, W Liu, C D Bucana, G E Gallick, and L M Ellis. EGCG, a major component of green tea, inhibits tumour growth by inhibiting VEGF induction in human colon carcinoma cells. Br J Cancer. 2001 March; 84(6): 844–850.

[14] K. Vijayaa, S. Ananthan, and R. Nalini. Antibacterial effect of theaflavin, polyphenon 60 (Camellia sinensis) and Euphorbia hirta on Shigella spp. — a cell culture study. Journal of Ethnopharmacology. Volume 49, Issue 2, 1 December 1995, Pages 115-118.

[15] Shuwen Liua, Hong Lua, Qian Zhaoa, Yuxian Hea, Jinkui Niua, Asim K. Debnatha, Shuguang Wub, , and Shibo Jiang. Theaflavin derivatives in black tea and catechin derivatives in green tea inhibit HIV-1 entry by targeting gp41. Biochimica et Biophysica Acta (BBA) - General Subjects, Volume 1723, Issues 1-3, 25 May 2005, Pages 270-281.

[16] Cai F, Li CR, Wu JL, Chen JG, Liu C, Min Q, Yu W, Ouyang CH, Chen JH. Theaflavin ameliorates cerebral ischemia-reperfusion injury in rats through its anti-inflammatory effect and modulation of STAT-1. Mediators Inflamm. 2006;2006 (5):30490.

Tea Facts

- In large population study, tea drinkers were found to have a lower risk of biliary tract cancers and biliary stones.[17]

- A 2001 study published by the American Heart Association concludes that, "Short- and long-term black tea consumption reverses endothelial vasomotor dysfunction in patients with coronary artery disease. This finding may partly explain the association between tea intake and decreased cardiovascular disease events."[18] The study was a joint effort of the Evans Department of Medicine and Whitaker Cardiovascular Institute, Boston University School of Medicine, Boston, Mass, and the Linus Pauling Institute, Oregon State University, Corvallis (B.F.).

- A 1991 study of 9,856 men and 10,233 women found that, "Mean serum cholesterol decreased with increasing tea consumption…." The same study found that the tea drinkers had lower systolic blood pressure. Also, the study found that tea drinkers of one or more cups per day had a slightly lower overall mortality rate. The study was conducted by the National Health Screening Service, Oslo, Norway, the Section for Dietary Research, Institute for Nutrition Research, University of Oslo, Oslo, Norway and the Department of Clinical Chemistry, Ullevål Hospital, Oslo, Norway.[19]

- A study of 61,057 Swedish woman concluded, "that tea consumption is associated with a reduced risk of epithelial ovarian cancer in a dose-response manner." Enrollment for

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[17] Xue-Hong Zhang, Gabriella Andreotti, Yu-Tang Gao, Jie Deng, Enju Liu, Asif Rashid, Kai Wu, Lu Sun, Lori C. Sakoda, Jia-Rong Cheng, Ming-Chang Shen, Bing-Sheng Wang, Tian-Quan Han, Bai-He Zhang, Gloria Gridley, Joseph F. Fraumeni Jr., Ann W. Hsing. Tea drinking and the risk of biliary tract cancers and biliary stones: A population-based case–control study in Shanghai, China. International Journal of Cancer, Volume 118, Issue 12, pages 3089–3094, 15 June 2006.

[18] Stephen J. Duffy, MB, BS, PhD; John F. Keaney Jr, MD; Monika Holbrook, MA; Noyan Gokce, MD; Peter L. Swerdloff, BA; Balz Frei, PhD; Joseph A. Vita, MD. Short- and Long-Term Black Tea Consumption Reverses Endothelial Dysfunction in Patients With Coronary Artery Disease. Circulation. 2001;104:151. Clinical Investigation and Reports. American Heart Association, Inc.

[19] Inger Stensvold M.Sc., , Aage Tverdal Ph.D., Kari Solvoll B.Sc. and Olav Per Foss M.D. . Tea consumption. Relationship to cholesterol, blood pressure, and coronary and total mortality. Preventive Medicine. Volume 21, Issue 4, July 1992, Pages 546-553.

participants was from 1987 to 1990. The participants were screened for cancer through December 2004 with an average follow-up of 15.1 years. Women who seldom or never drank tea were compared with three groups: less than one cup per day, 1 cup per day, 2 or more cups per day. It was concluded that, "tea consumption was inversely associated with the risk of ovarian cancer…." The study also measured that, "Each additional cup of tea per day was associated with an 18% lower risk of ovarian cancer."[20]

- Green tea consumption inhibits lung tumorigenesis and prevents lung tissue DNA lesions due to oxidative damage in mice.[21] 8-hydroxydeoxyguanosine (8-OH-dGuo) is a DNA lesion and green tea prevented its formation in lung tissues. The researchers attributed this phenomenon, at least in part, to green tea's antioxidant properties and EGCG.

- A 2002 study published by the American Heart Association and conducted by researchers at the Beth Israel Deaconess Medical Center, Harvard School of Public Health, and Massachusetts General Hospital concluded that, "tea consumption in tHe Year before acute myocardial infarction is associated with lower mortality after infarction." The study was of 1,900 patients hospitalized with acute myocardial infarction between 1989 and 1994. The median follow-up was 3.8 years.[22]

- A 2003 study published in *The American Journal of Cardiology* measured the effects of black tea consumption on coronary flow velocity reserve (CFVR) using transthoracic Doppler echocardiography (TTDE). The study concluded

[20] Susanna C. Larsson, MSc; Alicja Wolk, DMSc. Tea Consumption and Ovarian Cancer Risk in a Population-Based Cohort. Arch Intern Med. 2005;165:2683-2686.

[21] Yong Xu, Chi-Tang Ho, Shantu G. Amin, Chi Han, and Fung-Lung Chung. Inhibition of Tobacco-specific Nitrosamine-induced Lung Tumorigenesis in A/J Mice by Green Tea and Its Major Polyphenol as Antioxidants. Cancer Res July 15, 1992 52; 3875.

[22] Kenneth J. Mukamal, MD, MPH, MA; Malcolm Maclure, ScD; James E. Muller, MD; Jane B. Sherwood, RN; Murray A. Mittleman, MD, DrPH. Tea Consumption and Mortality After Acute Myocardial Infarction. Circulation. 2002;105:2476-2481. doi: 10.1161/01.CIR.0000017201.88994.F7.

that, "Acute black tea consumption improves coronary vessel function, as determined by CFVR."[23]

- A 1998 study notes that, "a case-control study on breast cancer patients revealed that high daily consumption of green tea was associated with a lower recurrence rate among Stages I and II patients. All the results suggest that consumption of green tea is a practical and effective cancer preventive both before cancer onset and after cancer treatment."[24,25] The study cites EGCG and epicatechin (EC), components of green tea, as having measurable chemotherapeutic effects on lung cancer tissue. The researchers measured that EGCG and EC enhanced apoptosis in lung cancer cells.

- A year 2000 study conducted by the Clinical Gerontology Unit, University of Cambridge School of Medicine, concluded that, "Older women who drank tea had higher BMD (bone mineral density) measurements than did those who did not drink tea. Nutrients found in tea, such as flavonoids, may influence BMD. Tea drinking may protect against osteoporosis in older women." The study was conducted with a patient sample size of 1,256 women between the ages of 65-76 years of age. Bone mineral density was higher in the areas measured in the study: lumbar spine, femoral neck, greater trochanter, Ward's triangle.[26] Ward's triangle is the bone of the femoral head region.

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[23] Kumiko Hirata, MD, Kenei Shimada, MD, Hiroyuki Watanabe, MD, Ryo Otsuka, MD, Koutaro Tokai, MD, Minoru Yoshiyama, MD, Shunichi Homma, MD, Junichi Yoshikawa, MD. Black tea increases coronary flow velocity reserve in healthy male subjects. American Journal of Cardiology. Volume 93, Issue 11 , Pages 1384-1388, 1 June 2004.

[24] Masami Suganuma, Sachiko Okabe, Naoko Sueoka, Eisaburo Sueoka, Satoru Matsuyama, Kazue Imai, Kei Nakachi and Hirota Fujiki. Green tea and cancer chemoprevention. Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis. Volume 428, Issues 1-2, 16 July 1999, Pages 339-344.

[25] Dugald Seely, ND, MSc Cand. The Effects of Green Tea Consumption on Incidence of Breast Cancer and Recurrence of Breast Cancer: A Systematic Review and Meta-analysis. Integr Cancer Ther. June 2005 vol. 4 no. 2 144-155.

[26] Verona M Hegarty, Helen M May and Kay-Tee Khaw. Tea drinking and bone mineral density in older women. American Journal of Clinical Nutrition, Vol. 71, No. 4, 1003-1007, April 2000.

Tea Nutrients

Black Tea, brewed, prepared with distilled water *Source: USDA National Nutrient Database for Standard Reference*		
Nutrient	Units	Value per 100 grams
Minerals		
Iron, Fe	mg	0.01
Magnesium, Mg	mg	1
Phosphorus, P	mg	1
Potassium, K	mg	21
Sodium, Na	mg	0
Zinc, Zn	mg	0.01
Copper, Cu	mg	0.008
Manganese, Mn	mg	0.219
Vitamins		
Riboflavin	mg	0.014
Pantothenic acid	mg	0.011
Folate, total	mcg	5
Folate, food	mcg	5
Folate, DFE	mcg_DFE	5
Other		
Caffeine	mg	20

Common Contraindications

- Tea stimulates the central nervous system and clears the Shen. However, it is not recommended after dinner as it may cause insomnia due to its caffeine content.

- Tea consumption interferes with iron absorption. It is generally not recommended for iron deficient patients or children.

- Caffeinated products may aggravate the lining of the stomach or duodenum and promote the secretion of acid. Tea is not recommended for patients with a stomach ulcer or duodenal ulcer.
- Tea is consumed when freshly made and loses medicinal benefits when stored overnight. Canned and bottled tea products are an exception to the rule in that they are sealed.
- Water, not tea, is appropriate for assisting in the consumption of pharmaceutical drugs. Tea has many chemical ingredients and may interfere with absorption.
- Tea consumption by breast-feeding mothers may interfere with lactation and may lead to overstimulation of the baby. It is recommended to curb or halt tea consumption.
- Patients with irregular heartbeats are recommended to avoid drinking tea. Tea may worsen the condition.

Tea Combinations and Applications

Pu-erh Tea with Fang Feng

Pu-erh	9-12 grams.
Fang Feng	9-12 grams.

Boil the combination for 1-2 minutes. This is effective for treating Tou Feng (Head Wind) headaches. Tou Feng headaches are caused by exposure to external wind. Like the wind, the pain moves to different locations. This home remedy is also useful for the treatment of headaches due to allergies.

Green Tea with Mint, Lemon, or Honey

Green tea prepared with mint, lemon, and/or honey is often used to soothe a parched or sore throat.

Green Tea External Soak

Green tea may be applied to external infections, eczema with discharge, and poison oak. Soak a towel in cold green tea and wash the affected area with the tea. This home remedy helps the burning to subside and reduces discharge.

Geng Mi Cha (Geng Mai Cha, Brown Rice Tea)

Geng Mi Cha is green tea with dry-fried rice. The rice is prepared with the chao method, stir-frying the rice without liquid. Geng Mi Cha becomes less cooling as a result of the frying process. In some preparations of Geng Mi Cha, the temperature becomes neutral or warming. The fried rice's warming effects often protect the Stomach Qi from digestive irritation associated with green tea consumption. The fried rice has a mild tonify Spleen Qi function. Historically, millet was dry-fried and added to green tea. Corn and other grains can also be used. Geng Mi Cha is popular in Japan.

Green Tea with Citrus Peel for Hangovers

Combine green tea with Ju Hong or Chen Pi for the treatment of headache, nausea, and malaise due to prior excess alcohol consumption. Add the ingredients to the cup, add hot water, and drink.

Simplified Chuan Xiong Cha Tiao San

Combine 1.5-3g of Chuan Xiong with green tea. Place the ingredients in a cup, add hot water, and drink. This is for the treatment of

minor cases of wind attack including wind-cold headaches and sinus congestion. Best results are achieved when taken at least one hour after meals because the wind-attack affects the upper jiao (burner). Green tea is also consumed when taking the patent formula Chuan Xiong Cha Tiao San.

Shi Ye Cha (Persimmon Leaf Tea)

Persimmon leaf with hot water is a traditional beverage. Historically, collecting the leaves from nearby trees was considered an alternative to purchasing tea. Village farmers drinking this tea often did not suffer from high blood pressure. Research shows that persimmon leaf (Shi Ye) has hypolipidemic effects.[27] To enhance the flavor, mix tea with persimmon leaves.

Research shows that oral consumption of persimmon leaf extract effectively reduces the presentation of atopic dermatitis, inhibits histamine release, and reduces serum IgE levels.[28]

Longjing Ju Hua Cha

Mix Longjing green tea or another variety of green tea with Ju Hua (Chrysanthemum), Shan Zha (Hawthorne Fruit) and Chen Pi (Tangerine Peel). This is a food treatment for high blood pressure and high cholesterol levels. Longjing Cha (Dragon Well Tea) is a variety of green tea from Hangzhou, Zhejiang Province, China. Also, a traditional shrimp dish is prepared with Longjing tea leaves. It is a local delicacy of Hangzhou.

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[27] J.S. Leea, M.K. Leeb, T.Y. Hac, S.H. Bokd, H.M. Parke, K.S. Jeongf, M.N. Woog, G.-M. Dog, J.-Y. Yeog and M.-S. Choig. Supplementation of whole persimmon leaf improves lipid profiles and suppresses body weight gain in rats fed high-fat diet. Food and Chemical Toxicology. Volume 44, Issue 11, November 2006, Pages 1875-1883.

[28] Mayumi Kotani, BSc, Motonobu Matsumoto, BSc, Akihito Fujita, BSc, Shinji Higa, MD, Way Wang, MD, PhD, Masaki Suemura, MD, PhD, Tadamitsu Kishimoto, MD, PhD, Toshio Tanaka, MD, PhD. Persimmon leaf extract and astragalin inhibit development of dermatitis and IgE elevation in NC/Nga mice. The Journal of Allergy and Clinical Immunology. Volume 106, Issue 1, Pages 159-166, July 2000.

Xiao Ku Cao Jue Ming Cha

Mix Xia Ku Cao and Jue Ming Zi with any variety of tea. Xia Ku Cao has a mild flavor and can be added whole or chopped. Jue Ming Zi requires grinding because it is a firm seed. This tea is appropriate as a dietary supplement for those with high blood pressure due to Liver Fire. Note: Jue Ming Zi is often consumed without other herbs or tea as a weight loss tea and for relieving constipation. Alternately, Chao Jue Ming Zi is a dry-roasted preparation of the herb that can be added to tea. Dry-roasted Jue Ming Zi provides a nice flavor and aroma.

Jiang Cha Wu Mei Yin

Combine 2-3 slices Sheng Jiang (fresh ginger), 2-3 pieces of Wu Mei (sour plum), and green tea. This preparation is a home remedy for the treatment of chronic coughs and loose stools. Wu Mei is astringent and helps to consolidate Lung Qi to relieving coughing and to treat diarrhea.

Another popular home remedy for the treatment of chronic coughs combines He Zi, Pang Da Hai, and green tea. This is also used for the treatment of a chronic sore throat and laryngitis. To use, put the ingredients in a cup and add hot water. The Pang Da Hai will expand and the flesh of the fruit can be eaten. Pang Da Hai treats hoarseness of the voice due to Lung Heat, hot phlegm, or Lung Yin deficiency. He Zi is astringent and also treats hoarseness of the voice. This mild combination can be used regularly and is particularly useful to those who speak or sing often.

Zhu Ye Mai Dong Cha

Combine dry or fresh bamboo leaves with Mai Men Dong and green tea. This tea can be consumed daily for the treatment of Yin deficiency and it promotes the production of bodily fluids (Jin Ye).

It is useful for the treatment of menopausal and diabetic syndromes.

Shan Zha Hong Cha

Combine a healthy amount of Shan Zha (hawthorn berry) with any variety of tea. Steep, then add Hong Tang (red sugar, crystallized cane juice). This sweet and sour tea is available as a pre-package product in Asian markets. However, many brands use an excessive quantity of sugar. Shan Zha removes food stagnation and this tea is helpful for children who have overeaten. Clinical grade Sha Zha usually contains seeds, however, dietetics grade Shan Zha (often found in Asian markets) has been cleaned and does not contain seeds. Use the seedless variety. Modern research shows that Shan Zha is helpful in reducing triglyceride and cholesterol levels.[29]

Lou Bo Cha

Combine sliced daikon (Lou Bou) with tea to make a soup or cup of tea. Drink the liquid and eat the daikon. Similar to Lai Fu Zi (radish seed), daikon radish removes food stagnation and descends the Qi.

Lian Zi Xin Cha

Combine Lian Zi Xin with green tea and steep. This is a food treatment for Heart Fire and Heart and Kidney not communicating. Lian Zi Xin is the heart of the lotus seed and is a *heart to heart* treatment according to Chinese medicine principles.

[29] Hong X, Hou-En Xu, Damien Ryan. A Study of the Comparative Effects of Hawthorn Fruit Compound and Simvastatin on Lowering Blood Lipid Levels. Volume: 37, Issue: 5(2009) pp. 903-908.

Individual Foods

In this section, we have added listings for a select group of individual healthy foods.

Onion

Onions are pungent, warming, bitter, and sweet. Onions enter the lung, large intestine, and stomach channels. Onions dissolve phlegm, promote urination, release the exterior (promote sweating), and stimulate digestion. Onions dissolve and expel cold phlegm in the chest and therefore alleviate lung congestion (e.g. bronchitis, common cold, coughs) and heart stagnation (e.g. angina).

Research confirms that many types of onions reduce hyperlipidemia. In a 2010 study of Welsh onions, "A significant lowering effect on cholesterol in the plasma and on total lipids, triacylglycerol, and cholesterol in the liver was observed in rats fed on the green, but not white, Welsh onion."[30] A 2001 study of garlic, onions and amla (Indian gooseberry) concludes that all three have hypolipidemic effects.[31] A 1987 study of cardiovascular disease from Manhattan College concludes that "use of certain formulations of garlic and/or onion is accompanied by favorable effects on risk factors in normal subjects and in patients with atherosclerotic disease."[32]

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[30] Biosci Biotechnol Biochem. 2010;74(2):402-4. Epub 2010 Feb 7. Welsh onion attenuates hyperlipidemia in rats fed on high-fat high-sucrose diet. Yamamoto Y, Yasuoka A. Graduate School of Human Life Science, Osaka City University, Japan.

[31] Indian J Exp Biol. 2001 Aug;39(8):760-6. A comparative study on the beneficial effects of garlic (Allium sativum Linn), amla (Emblica Officinalis Gaertn)and onion (Allium cepa Linn) on the hyperlipidemia induced by butter fat and beef fat in rats. Augusti KT, Arathy SL, Asha R, Ramakrishanan J, Zaira J, Lekha V, Smitha S, Vijayasree VM. Department of Medical Biochemistry, School of Medical Education, M.G. University, Kottayam, India.

[32] Preventive Medicine. Volume 16, Issue 5, September 1987, Pages 670–685. Garlic (Allium sativum) and onion (Allium cepa): A review of their relationship to cardiovascular disease. Barry S. Kendler, Ph.D. Department of Biology, Manhattan College, Riverdale, New York 10471 USA. dx.doi.org/10.1016/0091-7435(87)90050-8.

Studies indicate that onions benefit bone density. Research published in *Menopause, The Journal of the North American Menopause Society* notes,

> Onion consumption seems to have a beneficial effect on bone density in perimenopausal and postmenopausal non-Hispanic white women 50 years and older. Furthermore, older women who consume onions most frequently may decrease their risk of hip fracture by more than 20% versus those who never consume onions.[33]

Huang et al. make similar findings in a laboratory experiment, "The present study further verified that an onion-enriched diet could counteract ovariectomy-induced bone loss and deterioration of biomechanical properties."[34]

Xie Bai

Xie Bai (Chinese long-stamen onion) treats atherosclerosis, lowers both cholesterol and triglycerides, inhibits platelet aggregation, and lowers blood pressure.[35,36] Xie Bai regulates qi and treats painful obstruction of the chest (Xiong Bi) due to cold phlegm stagnation. Xie Bai is acrid, bitter, warm and enters the lung, large intestine and stomach channels. The herbal formula Gua Lou Xie Bai Bai Jiu Tang treats Xiong Bi related angina pain.[37] To prepare, decoct Gua Lou (trichosanthes fruit) and Xie Bai in a grain-based liquor or a mixture of liquor and water.

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[33] Matheson, Eric M., Arch G. Mainous III, and Mark A. Carnemolla. "The association between onion consumption and bone density in perimenopausal and postmenopausal non-Hispanic white women 50 years and older." Menopause 16, no. 4 (2009): 756-759.

[34] Huang, Tsang-Hai, Roman C. Mühlbauer, Chih-Hsin Tang, Hsiun-Ing Chen, Guan-Liang Chang, Yi-Wei Huang, Yu-Ting Lai, Hsin-Shi Lin, Wei-Ting Yang, and Rong-Sen Yang. "Onion decreases the ovariectomy-induced osteopenia in young adult rats." Bone 42, no. 6 (2008): 1154-1163.

[35] Planta medica. ISSN 1439-0221. 1986, vol. 52, no3, pp. 171-175. Effect of Oriental Plant Drugs on Platelet Aggregation; III1. Effect of Chines Drug "Xiebai" on Human Platelet Aggregation. Okuyama T. (1) ; Shibata S. ; Hoson M. ; Kawada T. ; Osada H.; Noguchi T. ; Department of Pharmacognosy and Phytochemistry, Meiji College of Pharmacy, Nozawa 1-35-23, Setagaya-ku, Tokyo, Japan.

[36] European Journal of Pharmacology. Volume 599, Issues 1–3, 3 December 2008, Pages 159–165. Endocrine Pharmacology. Novel effects of macrostemonoside A, a compound from Allium macrostemon Bung, on hyperglycemia, hyperlipidemia, and visceral obesity in high-fat diet-fed C57BL/6 mice. Weidong Xie, Yaou Zhang, Naili Wang, Hua Zhou, Lijun Du, Xiaohui Ma, Xiaojun Shi, Guoping Cai.

[37] Modern Journal of Integrated Traditional Chinese and Western Medicine. 2008-26. Experimental study of Gualou Xiebai kind prescriptions on pectoral stuffiness pain and precordial pain. Li Xiangyu,Wen Yuxia,Yuan Jinling. Cerebrovascular Disease Hospital of qinhuangdao,Hebei,China. CNKI:SUN:XDJH.0.2008-26-009.

Broccoli

Western broccoli has properties similar to Chinese broccoli for both taste and function. Visually, the Chinese variety has more stem and the Western variety has more flower. According to Five Element theory, the deep green color indicates that broccoli benefits the liver and eyes.

Broccoli is cooling, sweet, and enters the liver channel. Broccoli brightens the eyes, and clears the heat. Overall, broccoli has a mild medicinal effective action.

Broccoli is high in the carotenoids lutein and zeaxanthin. These two carotenoids are normally concentrated in the fovea, a central part of the retina that is the area of maximum visual acuity.

- Researchers conclude, "Diets rich in lutein plus zeaxanthin may protect against intermediate AMD (age-related macular degeneration) in healthy women younger than 75 years."[38]
- An AMD study notes that "visual function is improved with lutein alone or lutein together with other nutrients."[39]
- Researchers note, "Recent evidence introduces the possibility that lutein and zeaxanthin may protect against the development of the two common eye diseases of aging, cataract and macular degeneration."[40]

[38] Moeller, Suzen M., Niyati Parekh, Lesley Tinker, Cheryl Ritenbaugh, Barbara Blodi, Robert B. Wallace, and Julie A. Mares. "Associations between intermediate age-related macular degeneration and lutein and zeaxanthin in the Carotenoids in Age-related Eye Disease Study (CAREDS): ancillary study of the Women's Health Initiative." Archives of ophthalmology 124, no. 8 (2006): 1151-1162.

[39] Richer, Stuart, William Stiles, Laisvyde Statkute, Jose Pulido, James Frankowski, David Rudy, Kevin Pei, Michael Tsipursky, and Jill Nyland. "Double-masked, placebo-controlled, randomized trial of lutein and antioxidant supplementation in the intervention of atrophic age-related macular degeneration: the Veterans LAST study (Lutein Antioxidant Supplementation Trial)." Optometry-Journal of the American Optometric Association 75, no. 4 (2004): 216-229.

[40] Mares-Perlman, Julie A., Amy E. Millen, Tara L. Ficek, and Susan E. Hankinson. "The body of evidence to support a protective role for lutein and zeaxanthin in delaying chronic disease. Overview." The Journal of nutrition 132, no. 3 (2002): 518S-524S.

- Lutein and zeaxanthin are found in leafy green vegetables including spinach and kale. They are also abundant in broccoli, corn, and squash.

Banana

Bananas are sweet, cooling, and enter the lung and large intestine channels. Bananas clear the heat and moisten the large intestine. As a result, they are well suited for the treatment of dry stools. They are used for the treatment of constipation due to large intestine yin deficiency are and used as a food treatment for hemorrhoids. Although bananas have a function to stop chronic lung yin deficiency related coughing, it is a very mild effective action with little medicinal effect. This is a very sweet fruit and is not recommended for diabetics.

Researchers note that bananas have a relatively high serotonin content:

> Using a highly specific radioenzymatic assay we determined the serotonin concentration in 80 types of foods. The following fruits had a high serotonin concentration (mean +/- SEM) expressed in micrograms/g weight: plantain 30.3 +/- 7.5; pineapple 17.0 +/- 5.1; banana 15.0 +/- 2.4; Kiwi fruit 5.8 +/- 0.9; plums 4.7 +/- 0.8; and tomatoes 3.2 +/- 0.6. Only nuts in the walnut or hickory family had a high serotonin concentration expressed in micrograms/g weight; butternuts 398 +/- 90; black walnuts 304 +/- 46; English walnuts 87 +/- 20; shagbark hickory nuts 143 +/- 23; mockernut hickory nuts 67 +/- 13; pecans 29 +/- 4; and sweet pignuts 25 +/- 8. Ingestion of these fruits and nuts resulted in an increase in urinary 5-hydroxyindoleacetic acid excretion with no change in platelet serotonin concentration.[41]

Some researchers suggest that the nutritional content of bananas is linked to a reduction of hypertension:

[41] Feldman, Jerome M., and Ellen M. Lee. "Serotonin content of foods: effect on urinary excretion of 5-hydroxyindoleacetic acid." The American journal of clinical nutrition 42, no. 4 (1985): 639-643.

> Pulp of ripe banana, supplied daily (50 g/rat/day) together with standard food pellets, prevented an increase in blood pressure induced by the intramuscular injection of deoxycorticosterone enantate (DOC, 25 mg/rat) in rats given access to both water and 2% NaCl solution. The antihypertensive effect of banana was not related to reduced salt intake: on the contrary animals receiving banana during DOC-treatment consumed significantly larger amounts of salt relative to controls. The enhanced salt intake in banana-fed animals was not due to increased renal excretion of sodium. Ritan-serin, a 5-HTjc receptor antagonist, partially inhibited the effect of banana on DOC-induced salt intake, suggesting that the effect may be partially mediated by serotonergic mechanisms. This finding suggests that an increase in central serotonin levels triggered by the high triptophan and carbohydrate content of banana is responsible for the serotonin-mediated component of the natriorexic effect of banana. However, both the effect of banana on salt intake and that on blood pressure cannot be entirely accounted for by its influence on endogenous serotonin levels; additional mechanisms should be evaluated.[42]

Researchers suggest that the rich potassium content of bananas, and other foods rich in potassium and minerals, is beneficial for the control of hypertension. The following are two interesting paragraphs from research entitled *Potassium, Magnesium, and Calcium: Their Role in Both the Cause and Treatment of Hypertension*, published in *JCH, The Journal of Clinical Hypertension*:

> An increased intake of minerals such as potassium, magnesium, and calcium by dietary means has been shown in some but not all studies to reduce blood pressure in patients with hypertension. This review will discuss the roles of potassium, magnesium, and calcium in the prevention and treatment of essential hypertension with specific emphasis on clinical trial evidence, mechanism of action, and recommendations for dietary intake of these minerals. A high intake of these minerals through increased consumption of fruits and vegetables may improve blood pressure levels and reduce coronary heart disease and stroke.

[42] Perfumi, Marina, Maurizio Massi, and Giuseppe de Caro. "Effects of banana feeding on deoxycorticosterone-induced hypertension and salt consumption in rats." International journal of pharmacognosy 32, no. 2 (1994): 115-125.

> All of these meta-analyses do reveal a dose-response relationship between BP [blood pressure] lowering and potassium intake. Significant BP lowering with supplemental doses of potassium in the range of 1900 to 4700 mg/d (49–122 mmol/d) has been reported to result in BP lowering of approximately 2 to 6 mm hg for diastolic BP and 2 to 4 mm hg for systolic BP.[43]

Pomegranate (Shi Liu)

Pomegranate seeds are sweet, sour, and slightly astringent. Pomegranate seeds are slightly warming, enter the heart meridian, and tonify heart blood. According to five element theory, red foods favor benefitting the heart and blood. Red foods tend to have a warming temperature.

[43] Houston, Mark C., and Karen J. Harper. "Potassium, magnesium, and calcium: their role in both the cause and treatment of hypertension." The Journal of Clinical Hypertension 10, no. 7 (2008): 3-11.

Pomegranates have been linked to a decrease in LDL cholesterol, atherosclerotic lesions, and demonstrate anticancer properties. A Rambam Medical Center (Haifa, Israel) study notes the following:

> In humans, pomegranate juice consumption decreased LDL susceptibility to aggregation and retention and increased the activity of serum paraoxonase (an HDL-associated esterase that can protect against lipid peroxidation) by 20%…. Finally, pomegranate juice supplementation of E^0 mice reduced the size of their atherosclerotic lesions by 44%...."[44]

The Rambam Medical Center study provides an interesting history of pomegranate use:

> The pomegranate tree, which is said to have flourished in the garden of Eden, has been used extensively in the folk medicine of many cultures. In ancient Greek mythology, pomegranates were known as the "fruit of the dead" and in the ancient Hebrew tradition, pomegranates adorned the vestments of the high priest. The Babylonians regarded pomegranate seeds as an agent of resurrection, the Persians believed the seeds conferred invincibility on the battlefield, and for the ancient Chinese the seeds symbolized longevity and immortality. Edible parts of pomegranate fruit (about 50% of total fruit weight) comprise 80% juice and 20% seeds. Fresh juice contains 85% water, 10% total sugars, and 1.5% pectin, ascorbic acid, and polyphenolic flavonoids.[45]

A 2005 study published in the *Proceedings of the National Academy of Sciences of the United States of America* notes "that pomegranate fruit extract (PFE) possesses remarkable antitumor-promoting effects" and suggests "that pomegranate juice may have cancer-chemopreventive as well as cancer-chemotherapeutic effects against prostate cancer in humans."[46] Another study conducted by researchers from the University of California (Los Angels) and The

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[44] Aviram M, Dornfeld L, Rosenblat M, Volkova N, Kaplan M, Coleman R, Hayek T, Presser D, Fuhrman B., "Pomegranate juice consumption reduces oxidative stress, atherogenic modifications to LDL, and platelet aggregation: studies in humans and in atherosclerotic apolipoprotein E-deficient mice," Am J Clin Nutr. 2000 May;71(5):1062-76.

[45] Aviram et al., p. 1062-76.

[46] Arshi Malik, Farrukh Afaq, Sami Sarfaraz, Vaqar M. Adhami, Deeba N. Syed, and Hasan Mukhtar, "Pomegranate fruit juice for chemoprevention and chemotherapy of prostate cancer," PNAS October 11, 2005 vol. 102 no. 41 14813-14818.

University of Texas M.D. Anderson Cancer Center (Houston) states, "the polyphenolic phytochemicals in the pomegranate can play an important role in the modulation of inflammatory cell signaling in colon cancer cells."[47]

In some aspects of Chinese culture and feng shui, pomegranate seeds represent children. The many small seeds represent many children. The lantern appearance of the fruit represents happiness and good luck. Also, the pomegranate flower represents the skirt of a female.

Shi Liu Pi (Pomegranate Rind)

The skin of the pomegranate is sour, astringent, toxic, and enters the stomach and large intestine channels. Shi Liu Pi is antiparasitic and is used in herbal decoctions for the treatment of roundworms, tapeworms, and amoebic dysentery. Its astringent quality binds the intestines and consequently stops diarrhea, especially chronic diarrhea. Topically, Shi Liu Pi may be used in powder form to stop bleeding due to injuries. Internally, Shui Liu Pi is useful in herbal formulas for the treatment of uterine bleeding.

[47] Lynn S. Adams,,, Navindra P. Seeram,, Bharat B. Aggarwal,, Yasunari Takada,, Daniel Sand, and, David Heber, "Pomegranate Juice, Total Pomegranate Ellagitannins, and Punicalagin Suppress Inflammatory Cell Signaling in Colon Cancer Cells," Journal of Agricultural and Food Chemistry 2006 54 (3), 980-985.

Phytoestrogens

Phytoestrogens are plant derived compounds with estrogenic effects. Two major types of phytoestrogens are isoflavones and lignans. The following abstract is from research published by the Mayo Clinic:

> In October 1999, the US Food and Drug Administration authorized the use on food labels of health claims associated with soy protein and the reduced risk of coronary heart disease. Several studies have indicated that a total daily intake of 25 g of soy protein paired with a low-fat diet resulted in clinically important reductions of total cholesterol and low-density lipoprotein (LDL) cholesterol levels. Soybeans are a rich source of isoflavones, a class of phytoestrogens found predominantly in legumes and beans. Soy isoflavones are heterocyclic phenols with structural similarity to estradiol-17beta and selective estrogen receptor modulators. Actions at the cellular level depend on the target tissue, receptor status of the tissue, and the level of endogenous estrogen.
>
> Studies of soy-based diets evaluating the relation between soy consumption and serum lipid concentrations revealed that soy consumption significantly decreased total cholesterol, LDL cholesterol, and triglyceride levels. However, the soy isoflavones do not increase high-density lipoprotein cholesterol or triglyceride levels. The effects of soy protein on other target tissues reflect estrogenlike agonist and antagonist effects. Epidemiological studies suggest a protective effect of soy protein on breast tissue as evidenced by the lower rates of breast cancer in East Asian countries where soy is a predominant part of the diet.
>
> Data available from human studies on the effect of isoflavones on osteoporosis are limited, and additional studies are needed to support a role in osteoporosis prevention. Thus far, there is no evidence for a stimula-

> tory effect of isoflavones on the endometrium. A few studies reveal a minimal effect of soy on hot flashes, with soy reducing hot flashes 45% and placebo causing a 30% reduction compared with an approximate 70% reduction in hot flashes with estrogen replacement therapy. Evidence from laboratory studies reveals neither a positive nor a negative effect of soy isoflavones on cognition.
>
> To date, no adverse effects of short- or long-term use of soy proteins are known in humans. The only adverse effects known are those reported in animals (infertility in sheep and quails grazing on phytoestrogen-rich pastures). In conclusion, soy isoflavones are biologically active compounds. Current data are insufficient to draw definitive conclusions regarding the use of isoflavones as an alternative to estrogen for hormone replacement in postmenopausal women. Although epidemiological and basic laboratory studies allude to the possible protective effects of soy isoflavones at specific target tissues, randomized, placebo-controlled clinical trials are necessary to address these important issues.[48]

There exists conflicting information suggesting that phytoestrogens may be helpful or harmful.[49] The pros and cons must be weighed based on the available science. Unfortunately, science presents us with conflicting medical conclusions. Here are a few excerpts from "The pros and cons of phytoestrogens" published in *Frontiers in neuroendocrinology*:[50]

> Phytoestrogens are plant derived compounds found in a wide variety of foods, most notably soy. A litany of health benefits including a lowered risk of osteoporosis, heart disease, breast cancer, and menopausal symptoms, are frequently attributed to phytoestrogens but many are also considered endocrine disruptors,

48 Vincent, Ann, and Lorraine A. Fitzpatrick. "Soy isoflavones: are they useful in menopause?." In Mayo Clinic Proceedings, vol. 75, no. 11, pp. 1174-1184. Elsevier, 2000.

49 Patisaul, Heather B., and Wendy Jefferson. "The pros and cons of phytoestrogens." Frontiers in neuroendocrinology 31.4 (2010): 400-419.

50 Patisaul, Heather B., and Wendy Jefferson. "The pros and cons of phytoestrogens." Frontiers in neuroendocrinology 31.4 (2010): 400-419.

indicating that they have the potential to cause adverse health effects as well. Consequently, the question of whether or not phytoestrogens are beneficial or harmful to human health remains unresolved. The answer is likely complex and may depend on age, health status, and even the presence or absence of specific gut microflora. Clarity on this issue is needed because global consumption is rapidly increasing. Phytoestrogens are present in numerous dietary supplements and widely marketed as a natural alternative to estrogen replacement therapy. Soy infant formula now constitutes up to a third of the US market, and soy protein is now added to many processed foods. As weak estrogen agonists/antagonists with molecular and cellular properties similar to synthetic endocrine disruptors such as Bisphenol A (BPA), the phytoestrogens provide a useful model to comprehensively investigate the biological impact of endocrine disruptors in general. This review weighs the evidence for and against the purported health benefits and adverse effects of phytoestrogens.

4.1. Menopausal symptoms

The first widely attributed health benefit of phytoestrogen consumption was relief from vasomotor perimenopausal symptoms, including hot flushes and night sweats. For some women, the severity of these symptoms can markedly diminish their quality of life and interfere with daily activities. Although pharmaceutical hormone replacement therapy is effective in most cases, this option has fallen out of favor because of fears that its use increases the risk of developing breast cancer risk. Incidence of vasomotor symptoms is higher in Western countries (70–80% of women) than in Asian countries (10–20%), an observation which has led to the now popularly held belief that soy phytoestrogens may bring relief. Unfortunately, demonstrable evidence for such an association is weak at best, with most clinical trials showing no or minimal relief. One feature that stands out in nearly all studies is a large placebo

effect. In 2004 the North American Menopause Society issued a position statement which read, in part, "Among nonprescription remedies, clinical trial results are insufficient to either support or refute efficacy for soy foods and isoflavone supplements (from either soy or red clover), black cohosh, or vitamin E." Despite this uncertainty, dietary supplements continue to be popular, particularly among women seeking a "natural" alternative to hormone replacement therapy.

4.2. Prevention of osteoporosis

Another consequence of aging is the progressive loss of bone-mineral density, a process that accelerates during perimenopause and increases fracture risk. Estrogens help maintain normal bone density, and it has been hypothesized that phytoestrogens may confer similar benefits. Results from animal studies, although inconsistent and negative in some cases, are nonetheless encouraging. Numerous phytoestrogens including coumestrol, genistein, daidzein and others have been reported to have bone sparing effects in the rat but efficacy appears to depend on dose, route and duration of administration, and, to some degree, the animal model employed.

5. Breast cancer: pro or con?

Determining if phytoestrogens increase or reduce the risk of developing breast cancer has proven to be one of the most challenging human health impacts to address. It is well established that estrogens promote breast tumorigenesis, and that parameters which increase lifetime estrogen exposure (such as early menarche, short duration breastfeeding, and low parity) are associated with elevated breast cancer risk. Because they bind ERs with relatively high affinity, some researchers and clinicians are concerned that high phytoestrogen intake may increase the risk of carcinogenesis and put breast cancer survivors at risk for reoccurrence. Others have proposed that the opposite is true,

citing traditionally low cancer rates in Asia as evidence. Depending on the assay used, levels of endogenous estrogen present, life stage, and tumor type, genistein can act as both a proliferative and an antiproliferative agent. For example, in vitro, genistein can inhibit proliferation of ER-positive and ER-negative breast cancer cells at high doses (>10 M), but, paradoxically, promote tumor growth at lower, more physiological doses. Tamoxifen and other selective estrogen receptor modulators (SERMs) used for breast cancer therapy can also have mixed effects depending on dose and tissue type. The SERM-like activity of soy phytoestrogens makes dietary guidelines particularly difficult to issue with confidence.

A relatively large number of studies have taken an epidemiological approach to address these concerns, but the results have differed by region and patient population. A Dutch study comparing plasma isoflavone levels in women with and without breast cancer found that high plasma levels of genistein were associated with a 32% reduction in breast cancer risk. Most studies, however, have failed to corroborate such a profoundly beneficial effect of genistein. A meta-analysis, supported in part by the Susan G Koman Breast Cancer Foundation, concluded that, for Asian women, the risk of developing breast cancer drops as soy intake rises. As little as 10 mg of soy per day was sufficient to decrease breast cancer risk by 12%. This association was not found for Caucasian women, but average daily isoflavone intake in this group was considerably lower (under 1 mg per day). Thus, it is unclear, if higher intake levels would have been beneficial for Caucasian as well as Asian women. Paradoxically, a different meta-analysis of 18 studies published between 1978 and 2004 found a protective effect of soy in pre-menopausal Caucasian women, but not women of Asian descent.

Dietary intervention studies have generally produced negative results. One of the largest found that consumption of 50–100 mg isoflavones per day for 1–2 years did not reduce mammographic density, a biomarker of increased risk. Administration of a dietary supplement containing red clover derived isoflavones also failed to alter mammographic breast density after 1 year. The impact of soy on breast cancer survivors is also unclear and appears to differ by ethnicity.

The most recent study on breast cancer survivors examined 5042 Chinese women aged 20–75, and found that soy intake was significantly associated with a decreased risk of death and/or recurrence. These results are consistent with a prior study, also done in Chinese women, which found chemopreventitive effects of soy consumption, particularly among pre-menopausal women. As described previously, equol production has emerged as an important variable for achieving bone sparing effects and it may also prove to be an important predictor of cancer protection. An association between equol production and reduced breast cancer risk has been observed in at least one study of Caucasian women. Additional studies are needed to further explore the relationship between equol production and breast cancer risk.

Phytoestrogens may have the biggest impact on lifetime risk when exposure occurs prior to puberty and possibly before birth. Although not an initial goal of the study, a Hawaiian research group found an association between high soy intake during early life and increased breast density, a risk factor for breast cancer. The study consisted of 220 pre-menopausal women and was designed to determine if consumption of approximately 50 mg of isoflavones over 2 years in adulthood could reduce breast density. This intervention failed but life history data obtained during the process led the authors to conclude that Caucasian women who ate more soy over their lifetime had denser breast tissue than

those who did not. This observation is not consistent with an earlier study, which found that, in Chinese women, high intake over a lifetime is directly correlated with reduced risk of cancer.

Results from perinatal exposure in animals have also been mixed. For example, one early study of this hypothesis found that rat pups born to mothers that consumed genistein (25 or 250 mg/kg diet) during gestation and lactation developed fewer breast tumors. A more recent study, however, found that neonatal, subcutaneous administration of 5 or 50 mg/kg genistein stunted mammary gland development and the animals, particularly those given the higher dose, exhibited abnormal ductal morphology including reduced lobular alveolar development, and focal areas of "beaded" ducts lined with hyperplastic ductal epithelium. Subcutaneous administration of a lower dose (0.5 mg/kg genistein), produced the opposite effect. In these animals mammary gland development was advanced and no significant ductal malformations were observed in adulthood suggesting that accelerated differentiation might reduce cancer risk. This biphasic effect of genistein on breast tissue development and differentiation indicates that dose may be an important factor when considering risk.

The hypothesis that exposure to soy phytoestrogens early in life can alter the timing and character of breast development is supported by a 2008 cross-sectional study of 694 girls in Israel, which found increased prevalence of breast buds in 2-year old girls fed soy formula as infants. It is unclear how this may impact their lifetime risk of developing breast cancer but argues for a more thorough investigation of the possible relationship between early life phytoestrogen exposure, premature thelarche, and breast cancer risk.

Overall, although research in this area has been intense over the past two decades, results from both in vivo

and in virto studies have been frustratingly incongruous. Recent, comprehensive reviews of the human studies suggest a modest inverse association between risk and high soy intake but this trend is generally not supported by data from the animal literature. To date, no clear consensus has been reached on whether or not phytoestrogens are helpful or harmful, or when they might be contraindicated for some groups. Unfortunately, despite the need for guidance, in many published reviews of the topic too many authors shy away from making definitive recommendations and instead suggest that women "discuss the issue with their health care provider." This directive is unhelpful because it abdicates responsibility to clinicians, who are no more capable of giving informed opinions on the subject than research scientists.

Although a myriad of factors such as patient age, hormone receptor status of breast tumors, ethnicity, alcohol consumption, and other dietary habits likely all interact and complicate the potential impact of soy consumption on breast tumor proliferation, movement towards a clear consensus-based set of guidelines is badly needed. Given the evidence that adding soy foods to an already healthy diet may have modest but measurable benefits on bone and cardiovascular health, women without serious risk factors for breast cancer or a family history of breast cancer could likely incorporate soy into their diet without significant concern.[51]

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51 Patisaul, Heather B., and Wendy Jefferson. "The pros and cons of phytoestrogens." Frontiers in neuroendocrinology 31.4 (2010): 400-419.

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