



Session 3: General Guidelines and Foods to Include



Course: Nutrition and You: Functional Foods

Presentation Created by
Melissa Halas-Liang, MA,RDN,CDE

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Objectives

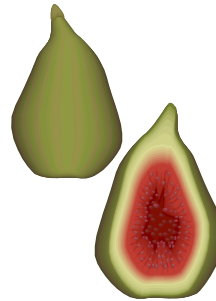
Students will be able to:



1. Identify how specific functional foods work in the body.
2. Recognize fruits, vegetables and whole grains as functional foods.
3. Discuss the functional components of tea.
4. List the benefits of the specific functional component of each food.
5. State the health benefits of blueberries and guidelines on consumption.
6. Provide guidelines on the use of cocoa as a functional food.

+ Outline

- General Guidelines
- Tea & Functional Beverages
- Blueberries
- Chocolate
- Fiber
- Soy

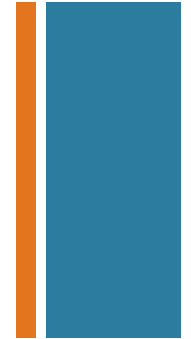


+ Your Grocery Store: Are You Familiar Enough With the Fruit & Veggies Aisle?



- Remember learning about fruits and vegetables being Functional Foods in week 1?
- Are you working toward getting the recommended amounts of servings per day?
- Have you tried visiting your local farmer's market and buying fruits that are in season?
- Have you visited any of the sites listed in week 1?
 - www.fruitsandveggiesmorematters.org (excellent site – previously 5aday.gov –planning, shopping, healthy resources)
 - www.aicr.org (American Institute for Cancer Research –great recipe newsletter and much more)
 - www.superkidsnutrition.com (resources for family nutrition developed by Registered Dietitians and nutrition scientists)

+ Guidelines for Choosing Fruits and Vegetables



- All fresh fruits and vegetables of different colors offer health-promoting phytochemicals
- Frozen is a good alternative to fresh.
 - The freezing process helps retain nutrients and produce is often frozen immediately after harvest. Frozen produce may even be higher in nutrients and phytochemicals than fresh produce that has been transported a long way or has been sitting awhile on grocery shelves.
 - I discuss frozen foods in this preschool article:
<http://www.todaysdietitian.com/newarchives/120913p20.shtml> (if the link doesn't work google Today's dietitian Plant foods Preschoolers)
- .



Guidelines for Choosing Fruits and Vegetables



- Any vegetables are better than no vegetables at all, but preferably choose plain frozen vegetables, not those packed in butter, cream or cheese sauces
- Canned fruit contains phytochemicals too, but avoid those packed in heavy, sugary syrup
- There's tips on saving money with produce here:
<http://www.landomoms.com/2015/01/05/how-to-stretch-dollars-at-the-grocery-store/> (if the link changes google landomoms melissa halas-liang)
- Here's some winter salad recipes:
 - <http://www.landomoms.com/2015/01/05/winter-salad-recipes/>
 - <http://melissashealthyliving.com/blood-orange-fennel-salad/>
 - <http://melissashealthyliving.com/marians-veggie-bean-salad/>
 - <http://melissashealthyliving.com/2-tasty-colorful-jicama-salads/>



Review of Other Functional Foods

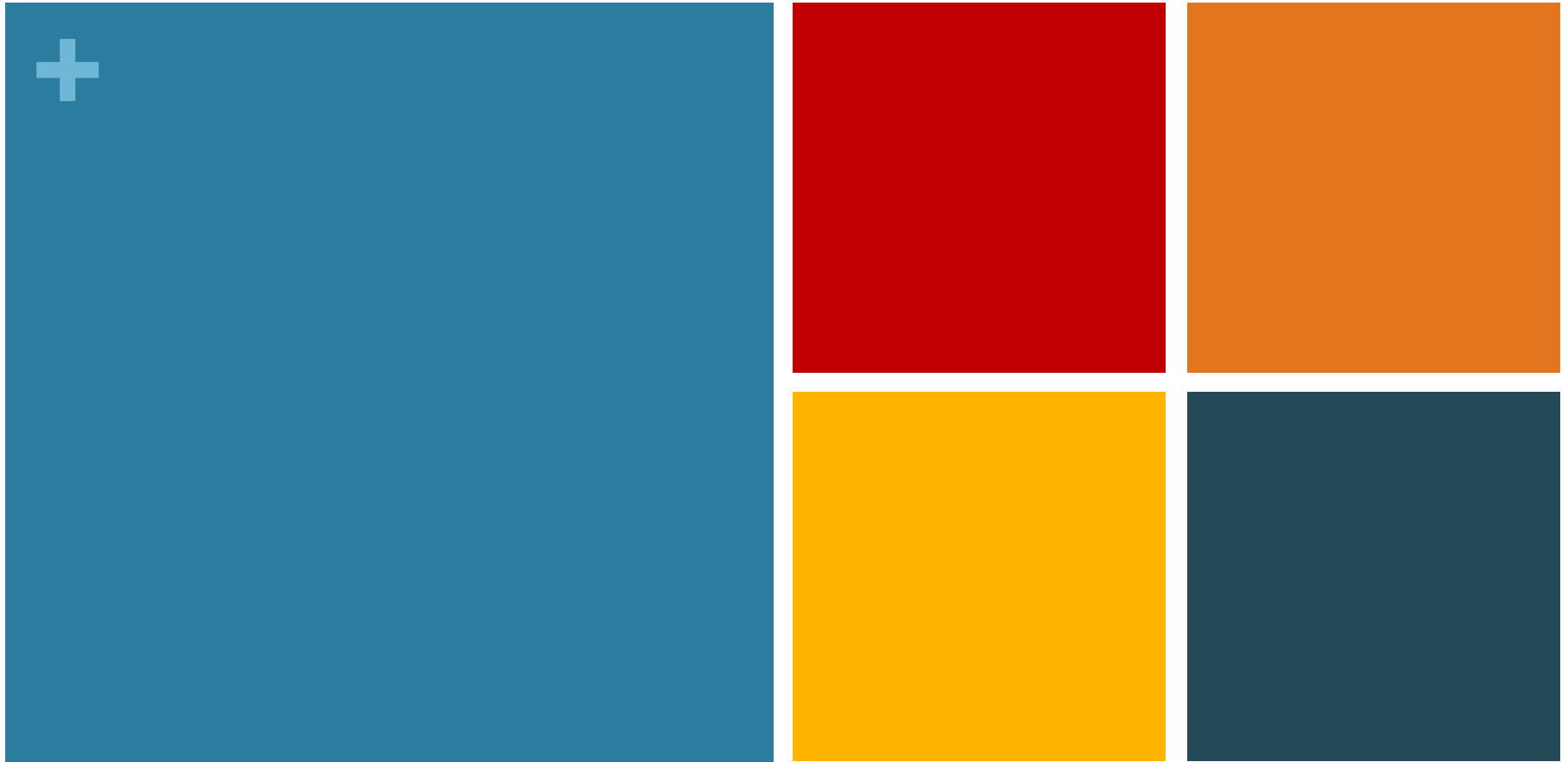


- Whole grains naturally provide fiber, vitamins and minerals and reduce risk of heart disease and certain cancers.
 - Whole grain breads, quinoa pasta, whole-wheat pasta, brown rice, red rice, bulgur, millet, quinoa, oats and buckwheat:
<http://www.superkidsnutrition.com/nutrition-articles/buckwheat-a-gluten-free-super-food/>
 - Have you tried quinoa? It comes in a grain, pasta, bread and flour. It's very high in protein. Be sure to rinse it first if you buy in bulk and toast it on the stove top:
<http://melissashealthyliving.com/?s=quinoa>
- Eggs that are fortified with omega-3 fatty acids, a type of fat that may help protect against heart disease.
- As discussed in week 2, Yogurt that contains live and active cultures, indicated on the container.

+ Healthy Food Effects

- An overall dietary pattern is likely to have a greater effect on human health than a single nutrient (Nikolaos Scarmeas)
- What's healthy for your heart is healthy for your brain and is likely to help prevent cancer too.
- 1 in 2 Americans get cancer in a life time
<http://www.aicr.org/can-prevent/>. 1 in 3 Cancers are Preventable through diet and lifestyle. Check out this site for cancer prevention: <http://www.aicr.org/can-prevent/> Then visit the Healthy Kids Today, Prevent Cancer Tomorrow campaign: www.aicr.org/healthykids





Tea and Functional Beverages

+ Functional Beverages – Tips to Try



- A few ounces of blueberry pomegranate juice + brewed green tea or fruit tea. Chill and drink throughout the day
- Mix purple grape juice & tea
 - Contains flavonoids, which may help reduce risk of heart disease, lower blood pressure and limit formation of blood clots
- Choose 100% cranberry juice and mix with sparkling water (optional: squirt of lime juice), which may help reduce risk of urinary tract infections and dental cavities.

+ Functional Beverages: Grapes and Red Wine Contain Phytochemicals

- Studies show that moderate consumption of alcohol independently reduces heart disease risk
- 1 oz proof spirits, 5 oz wine, 12 oz beer
- Alcohol is further discussed in the course Public Nutrition and Wellness Education
- Make sure alcohol isn't sabotaging your weight:
<http://melissashealthyliving.com/calorie-cocktail-bombs-sabotaging-weightloss-goals/>



+ Alcohol's Risk



- Excessive drinking increases the risk for many types of cancer
- Even moderate drinking may increase cancer risk
- Limit alcohol to one drink per day for women and 2 drinks per day for men



+ Tea Time: Introduction



- Tea is second only to water as the most consumed beverage in the world.
- *Did you know?:* Green, black and white tea are all made from the same shrub, *camellia sinensis*.
- Green tea is made from steamed and dried leaves, whereas black tea is made from the fermented leaves of the same plant.
 - Rapid inactivation of the enzyme, polyphenol oxidase, by steaming or rapid pan firing, rolling and high temperature air drying, is used to make green tea in Japan and China, and preserves the polyphenol content
- Both kinds of tea have been investigated for health benefits.
- Herbal teas are made from other plants and may have different effects on health.

+ Tea Time: Phytochemicals in Tea

- Both black and green tea are rich in a group of chemicals called flavonoids
- Green tea in particular contains a type of flavonoid called catechins. One catechin that has received most attention is epigallocatechin-3-gallate or EGCG.
 - It has been estimated that one cup of green tea can contain 100 to 200 mg catechins (to be discussed)



+ Tea Time: Catechins



- White tea is the best source of catechins followed by green tea
- **Catechins increase nitric oxide production, inhibit platelet aggregation, and improve vasodilation.**
 - Although catechins are antioxidants in vitro, there is no evidence that this effect is meaningful in humans because concentrations in the body are very low. Vitamins C and E are more effective antioxidants in humans.
 - These compounds have biological effects other than as antioxidants.
 - Nitric oxide is one of the factors that allows blood vessels to widen, thus improving blood flow.
- Research suggests that green tea and / or catechins may promote apoptosis in cancer cells, enhance immune system function, and reduce stroke related brain damage.

+ Tea Time: Health benefits

Cancer



- Studies suggest: may reduce the risk of breast, bladder, stomach, colon, esophageal, rectal and skin cancer.
- Epidemiological data indicate that consumption of black and green tea may reduce the risk of respiratory, skin, GI tract and reproductive cancers
- In general, the studies on tea, flavonoids, and lung cancer risk indicate a small beneficial association, particularly among never-smokers. More well-designed cohort studies, in particular for catechins, are needed to strengthen the evidence on effects of long- term exposure to physiological doses of dietary flavonoids
- Tea drinking may **not** decrease the risk of colon cancer



Tea Time: Health benefits

Cardiovascular disease



- Green and oolong tea have been found to reduce risk factors for heart disease such as oxidized LDL in cholesterol in animals
- Meta-analysis, including studies in five different countries and 194,965 people, found that 3 cups of black or green tea per day led to a 21% reduction in the risk of stroke.



Tea Time: Health benefits

Cardiovascular disease



- Studies suggest that the antioxidant properties of black and green tea polyphenols help prevent blood pressure increases.
- Green tea extracts may also help lower blood pressure by preventing or scavenging of superoxide anion generation; however I advise against taking extracts.
- Thus, the regular consumption of black and green tea may also provide some protection against hypertension in humans.
 - The equivalent for humans to consume the amount of tea given in this study to rats would be about 1 liter a day or approximately 4 cups.



Tea Time: Health benefits

Diabetes

- Green tea has been shown to reduce eye and kidney damage associated with diabetes in animals.
 - It may be beneficial to promote tea in people with diabetes





Tea Time: Health Benefits

Weight Loss



- Choose tea over sweetened beverages. Tea may aid in weight loss as it can increase your fluid intake which can help prevent you from over-eating.
- When stressed instead of snacking –have a relaxing cup of tea.
- There has been some research that shows green tea can increase metabolic rate and the degree to which fat is used as an energy source
 - It is important to understand that although a study may seem clinically relevant, it may not translate into practical relevance
 - Often when people hear that something boosts metabolism, they don't consider by how much
 - It may mean you would need to drink several cups a day just to burn enough extra calories to have a breath mint



Tea Time: Health Benefits

Added benefits



- Tea contains antibacterial properties and decreases cavity causing bacteria in the mouth
- Iron binding effect for people with iron storage diseases such as Hemochromatosis.
 - This effect is not beneficial for individuals at risk for iron deficiency anemia.
- Green tea may have therapeutic potential in non-alcoholic fatty liver disease (NAFLD)
- Tea can also be used as a time to relax, unwind and hydrate! Instead of reaching for chips or snack food, sit down with a warm cup of tea and unwind.

Masterjohn and Bruno. 2012. Therapeutic potential of green tea in nonalcoholic fatty liver disease. *Nutrition Reviews*. Vol. 70(1):41–56

+ Tea Time: Health Claims?



- FDA allows qualified health claims for green tea on conventional foods and dietary supplements.
- This claim may appear in products that do not exceed FDA recommended levels of total fat, saturated fat, cholesterol and sodium, and in foods, contain at least 10% daily value of certain other nutrients, such as vitamin C:
 - “Green tea may reduce the risk of breast or prostate cancer although the FDA has concluded that there is very little scientific evidence for this claim.” See AICR.org foods that fight cancer green tea.
 - Green tea ice cream may not meet this criteria

<http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm073992.htm#gtea> Updated March 13, 2013. Accessed April 21, 2014.



+

THINK TEA!
Hot - relaxing
or
Cold - refreshing



+ Tea Time: How much?



- For physiologic effects, **drink 3 or more cups of tea every day.**
- Drink **unsweetened** brewed tea. Tea flavored food may not have the same effect.
- Although most research has been conducted in hot teas, researchers believe that iced teas (unsweetened) might have the same properties.
- If you're interested in waste reduction, look for teas that have reduce packaging and don't contain the string and label, but just the tea bag.

+ Tea Time: Recommendation

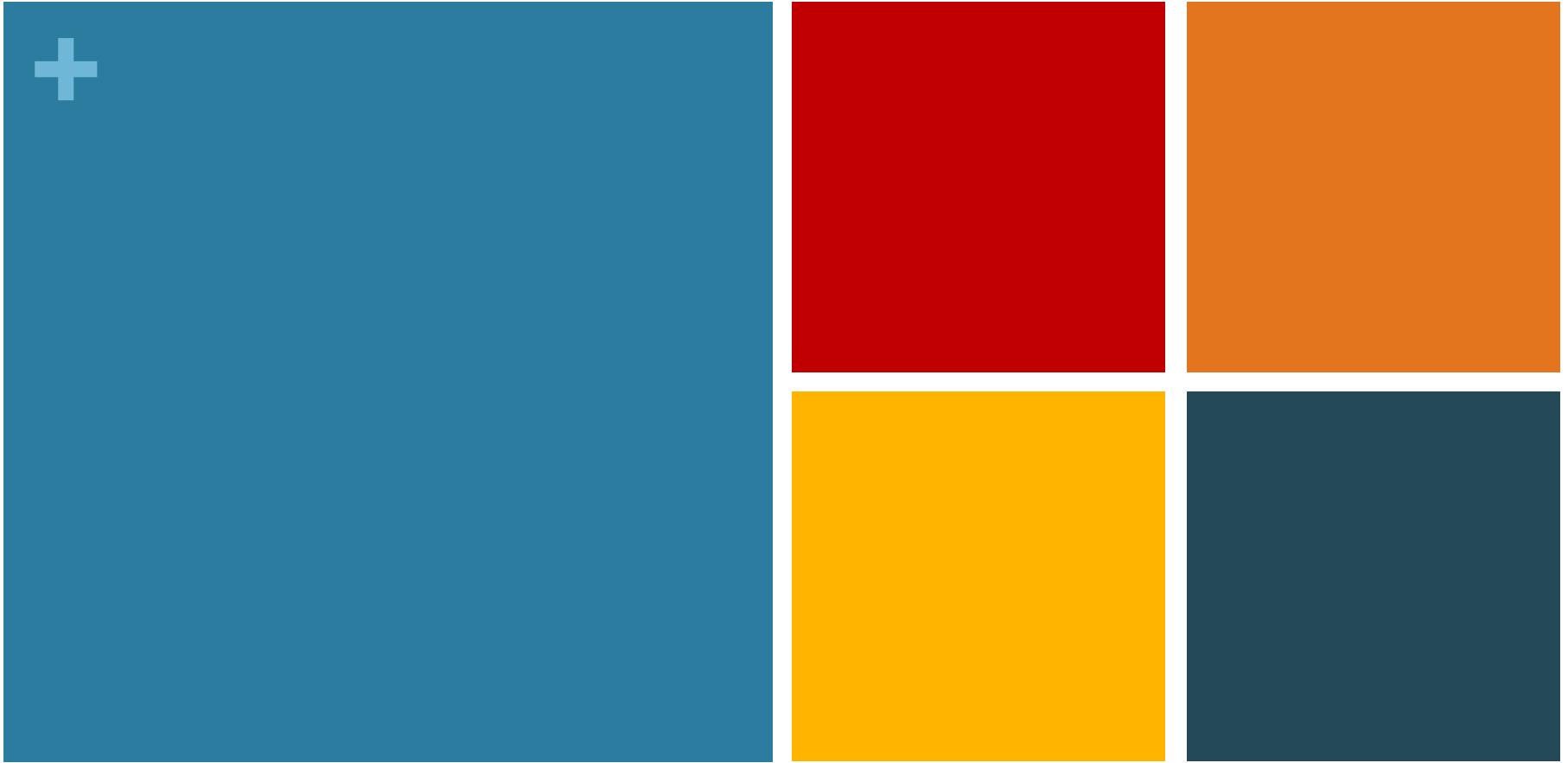


- Nutrition professionals should obtain a thorough history, including medications use, when counseling patients on tea consumption.
- A majority of interactions and adverse reactions appear to be due to the effect of the caffeine content of the tea rather than the polyphenol content.
- Because of the extra processing involved, decaf teas may have fewer bioactive compounds.
- When brewing tea, for the best quality use a water temperature just under boiling.

+ Tea Safety

- In China people have been drinking green tea for at least 3,000 years. The typical amount is 3 cups per day.
- It is generally safe, however there are potential risks:
 - Black and green teas both contain caffeine, though green tea (30-80mg per cup in black vs. 35-60mg per cup green).
 - Too much caffeine may cause nausea, trouble sleeping, irregular heartbeat, anxiety.
 - Tea may stain your teeth, but this stain can be removed by polishing at the dentist's office.
 - The high polyphenol content that provides health benefits also can interfere with the absorption of nutrients, such as iron, and medicine.
 - Vegetarians, particularly women of child-bearing age, should avoid drinking coffee or tea with meals to absorb more iron.





Blueberries

+ Introducing the BLUEBERRY

- *Ericaceae vaccinium*
- Wild blueberries have almost twice as many proanthocyanidins as cultivated.
 - Proanthocyanidins may help prevent urinary tract infections by preventing bacteria from sticking to the walls of the urinary tract
- Make blood platelets less sticky, lowering the risk of blood clots
- In a small study with post menopausal women with hypertension –after 2 months of eating daily freeze-dried blueberry power (equivalent to 1 cup of blueberries) systolic blood pressure dropped by 7 points & diastolic fell by 5 points.
- Available fresh, frozen, dried and as juice
- All are rich in phytonutrients

Journal Acad. Nutr Diet 115: 369, 2015

+ Blueberries : Food Tip



- When buying fresh berries
 - Choose firm, uniform in size, indigo blue with a silver, powdery look
- Rinse thoroughly right before serving.
- While best eaten right away they will keep refrigerated for up to 5 days
- Buy them frozen in the winter

**Check out your local
farmer's market!**



+ Blueberries: Berry Good!

- Berries contain polyphenols called anthocyanins. These compounds are responsible for the blue, purple or red color of berries.
- Amount of anthocyanins in berries of the same weight (100g):
 - Elderberry: 1,550mg
 - Blueberries: 415mg
 - Strawberries: 22mg
- Research with anthocyanins has indicated these biological effects:
 - Prevention of retinopathy in individuals with diabetes (600mg /day for 2 months)
 - Protective against cardiovascular disease and stroke

+ Blueberries: Berry Good!



- Epidemiologic evidence (population studies) suggest that people who eat berries (1-5 servings per week), or have an anthocyanin rich diet, have better cardiovascular health than those who do not.
- Clinical studies indicate that berries can have beneficial effects on blood pressure, cholesterol, and blood sugar control.
- Effective dose ranges from 110g to 500g per day (1 cup blueberries = 140g)

Arab, L. Moving beyond Antioxidants: Making Phytochemicals a Prescription for Health.
Power Point Slides from FNCE

Agricultural Research Service United States Department of Agriculture.
<http://ndb.nal.usda.gov/ndb/foods/> Accessed April 2015.

+

EAT BLUEBERRIES



➤ Frozen or Fresh – ½ cup most days (or other power packed berry, like black berries)

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➤ Add to yogurt, cereal, smoothies, frozen yogurt

➤ Dried blueberries in salads



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I changed the font back to Arial to match the rest of the presentation

Brooke Sinclair, 6/12/2012

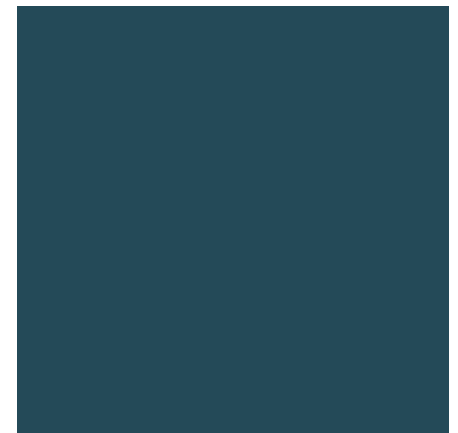


Yummy!

Tip: Try growing your own! Plant a combination of peat moss in a barrel. Keep soil moist and feed acid loving plant food or serve it 1 cup vinegar for a gallon of water once every 10 days. Enjoy your harvest, like the one above!

**Grow your own –learn how:
<http://melissashealthyliving.com/how-to-grow-blubberies/>**





Chocolate

+ Chocolate

The Kuna

- The Kuna are the indigenous population of the San Blas Islands of Panama.
- Traditionally, this group drank four 8-ounce cups of cocoa beverages per day.
- Researchers noted that even in adults older than 65 years, the mean blood pressure was 110/70.
- But when Kuna individuals moved from their homeland, they drank 10 times less cocoa and their blood pressure was comparable to that of Western populations.
- Many factors may be involved in the increased BP, but the possibility that chocolate could be protective against cardiovascular disease intrigued researchers.

+ Chocolate: Introduction



- Cocoa is an extract from the *Theobroma cacao* tree.
- Cocoa, cocoa extracts, and purified cocoa are rich in polyphenols, including flavonols, catechins, and proanthocyanidins.
- Milk chocolate and white chocolate contain negligible amounts of these compounds.



+ Chocolate

Flavonols



- Flavonols themselves have a bitter flavor. Processing techniques, such as fermentation, roasting, alkalizing (dutching), and adding sugar, milk, vanilla and emulsifiers, are used to increase the palatability of cocoa.
- The stage of growth of the cocoa bean, the cultivar type, handling, and manufacturer processing techniques all change the types and ratios of different kinds of flavonols in cocoa products.
- Other foods also have flavonols. Amount of flavonols per equal weight (100g fresh):
 - Onions: 15.4-38.7 mg
 - Cocoa: 20.1 mg
 - Tomatoes: 0.6 mg

Latham LS, Hensen ZK, Minor DS. Chocolate-Guilty Pleasure or Healthy Supplement? *The Journal of Clinical Hypertension*. 2014;16(2):101-106. Prior R. Phytochemicals. In: Shils ME. Modern nutrition in health and disease. 10th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006: 582-594

+ Chocolate

Flavonols



- Chocolate and dietary flavonoids may exert a protective effect on the Cardio Vascular system.
- Flavonols may decrease platelet adhesion and aggregation in healthy individuals.
- Studies consistently indicate that flavonols improve endothelial function and increase nitric oxide production which may lead to blood pressure reduction.
 - The endothelium is the inside lining of blood vessels. When the endothelium does not dilate properly, it increases risk for heart attack and stroke.



+ Chocolate

Health Benefits of Indigestible Flavonols



- Intriguing research suggests that the health benefits of chocolate come in part from compounds that are not immediately absorbed in our gut.
 - Molecules that are too large to be absorbed in intestinal cells, called polyphenolic polymers, remain in the gut and become food for beneficial bacteria. These beneficial bacteria, such as lactobacillus, increase in number.
 - Smaller products of this break-down by bacteria now become absorbable. These products, including short chain fatty acids and phenolic acids, may benefit health by reducing inflammation, improving cholesterol, and more.
- The composition of gut bacteria is called our **microbiome**. Emerging research on our microbiome suggests that these bacteria not only impact our intestinal health, but also our weight and diseases such as diabetes, and possibly even depression.



Chocolate

Health Benefits of Indigestible Flavonols



- These in vitro observations have been supported in animal studies: studies in mice suggest that some indigestible flavonols in cocoa may protect mice from obesity and diabetes.
- There may be some benefits to taking cocoa flavanols for the brain, improving cholesterol and triglycerides but larger studies are needed. Also funding has been by Mars Inc as they are marking flavanol packets. Looks promising but time will tell.

Mastroiacovo et al. Cocoa flavanol consumption improves cognitive function, blood pressure control, and metabolic profile in elderly subjects: the Cocoa, Cognition, and Aging (CoCoA) Study—a randomized controlled trial. *Am. J Clinical Nutr.* 2014

+ Cocoa: Studies stated...

- Several in vivo studies have provided strong support for the hypothesis that the consumption of flavonoid-rich foods, such as certain cocoas and chocolates, may be associated with reduced risk for vascular disease
- A meta-analysis concluded that flavonol rich cocoa products had a small but clinically significant effect on reducing blood pressure. Amounts of chocolate studied ranged broadly from 6.3g to 105g daily.

Source for meta-analysis: Latham LS, Hensen ZK, Minor DS. Chocolate-Guilty Pleasure or Healthy Supplement? *The Journal of Clinical Hypertension*. 2014;16(2):101-106.

Am J Hyperens. 2005 Jun;18(6): 785-91

+ Chocolate

Risks



- Caveat: Most chocolate in our food system is highly processed with negligible amounts of flavonols combined with saturated fat and sugar. Choose raw cocoa nibs, add cocoa powder to peanut butter or other dishes. See: <http://melissashealthyliving.com/how-to-choose-the-best-chocolate/>
- Eating excessive calories, or adding chocolate can lead to weight gain. (Obesity 2015.doi:10.1002/oby.20983.)
- Chocolate also contains caffeine (5-35 mg/oz) and the compound theobromine, to which some people have reactions similar to caffeine.
- Be present when you indulge in a chocolate treat!
 - Sit down, without distractions (TV, kids yelling, etc.)
 - Eat it and be mindful of the tastes you experience
 - You'll be less likely to overindulge!

+ Chocolate Risks



- Chocolate contains stearic fatty acid.
 - On an epidemiologic level, there are at least some prospective cohort data that suggest an adverse impact of stearic acid on cardiovascular health.
 - Based on 14 years of follow-up in 80,000 women, investigators with the Nurses' Health Study found that dietary stearic acid increased the risk of coronary heart disease to a similar degree compared with other saturated fatty acids.
- However, chocolate consumption itself was not associated with a significant increase in risk in this study, at least at moderate levels of 3 to 4 oz per week.

+ Chocolate

Bottom Line



- The percentage cacao on a product does not necessarily represent its flavonol content.
- Unfermented cocoa beans and beans with minimal roasting have higher flavonol content than other chocolate products per calorie and weight.
- In general, the order of different types of chocolate from highest to lowest concentration of flavonols is as follows: raw cocoa, cocoa powder, baking, semi-sweet chips, dark, syrup, milk.
- It takes at least 200 mg of flavonols to get the proposed improvements in blood flow.
 - In general, 1 $\frac{3}{4}$ tablespoon cocoa powder or 2 oz dark chocolate contain about this much. Dark chocolate contains far more calories.

Miller KB, Hurst WJ, Flannigan N, et al. Survey of commercially available chocolate- and cocoa-containing products in the United States. 2. Comparison of flavan-3-ol content with nonfat cocoa solids, total polyphenols, and percent cacao. *Journal of agricultural and food chemistry*. Oct 14 2009;57(19) 9169-9180.

+ Chocolate - Bottom Line

- To reap the potential benefits of chocolate, one would need to cut calories elsewhere in their diet so that they don't put on weight.
- Choose fair trade chocolate when possible.
- **Suggested dose:** 2 tablespoons cocoa powder daily but limit chocolate to 3-4 oz/week.
 - Try 2 tablespoons unsweetened cocoa powder added to oatmeal, milk, or yogurt.
 - Choose unsweetened versions and add sweeteners sparingly yourself.
 - Subscribe to FDA food alerts –foods can occasionally be tainted. In 2014 there was warning about a popular natural cocoa powder brand that exceeded safe cadmium levels.



+ Honorable Mentions – Grapes/wine, apples, blackberries, cherries, figs, plums



- Increased plasma antioxidant activity
- Decreased plasma concentrations of lipid peroxide
- Increased HDL cholesterol concentration
- Decreased LDL cholesterol concentration
- Decrease in Systolic BP



American Journal of Clinical Nutrition, Vol. 81, No. 1, 243S-255S, January 2005

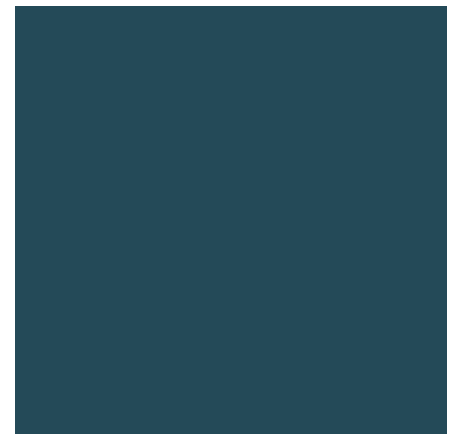
American Journal of Clinical Nutrition, Vol. 84, No. 1, 95-135, July 2006

+ Cocoa, grapes/wine, apples, blackberries, cherries, figs, plums



- Try thinly sliced dried mission figs in salads –it’s delicious!
- Buy frozen cherries, microwave them for 1-2 minutes and add to plain low fat yogurt for breakfast
- Put frozen cherries, yogurt, cinnamon and vanilla extract in a blender or food processor for a home made frozen dessert
- Freeze grapes w/other fruit like melon on a stick and serve them as a kabob-sicle!





Fiber

+ Defining Dietary Fiber



- Unofficial working definition of fiber: “the plant polysaccharides and lignin which are resistant to hydrolysis by digestive enzymes of man”
 - Dietary fiber is mostly made from storage and cell wall polysaccharides of plants that cannot be digested by humans.
 - However, some fiber added to foods is not from plants, but synthesized in a laboratory.
 - Although research consistently demonstrates health protective effects of fiber found naturally in whole foods, it is uncertain that natural or synthesized fiber added to foods by manufacturers exerts the same effects.



+ Fiber: Fermentable and Viscous



- Whereas previously fiber was divided into soluble and insoluble types, recent studies indicate that it is more accurate to think of fiber in terms of its **fermentable and viscous** properties.
 - Food labels may still use the terms soluble and insoluble.
 - Viscous fibers turn into a thick, sticky consistency in the gut that aids in the removal of LDL cholesterol and may slow your body's process of making new cholesterol.
 - Fermentable fibers are broken down by gut bacteria.



Fiber: How much?

- Recommended daily amounts of total fiber are **14 g per 1000kcal**. Based on caloric intake, this can be calculated as:
 - 25g for women
 - 38g for men
 - After age 50 daily fiber needs drop to 21g for women and 30g for men. This is because calorie needs drop.
 - **Average American eats 12-15g/day**
- According to the Academy of Nutrition and Dietetics, eating the recommended 2 cups fruit and 2 ½ cups vegetables every day, along with whole grains and beans, will help individuals meet fiber goals.
- Fill half your plate vegetables and a quarter with whole grains. Eat leafy greens, whole grains, beans and nuts (this provides fiber & magnesium)
- Follow the ChooseMyPlate guidelines!



+ Fiber and the FDA



- Fiber content of common foods per serving:
 - 1 pear: 4g
 - ½ cup cooked lentils: 7.8g
 - ¾ cup wheat bran flakes: 4.6g
 - 1 slice white bread: 0.6g
- The US Food and Drug Administration (FDA) has defined the following terms for food labeling:
 - High fiber = 5 grams or more of fiber per serving
 - Good source of fiber = 2.5 grams to 4.9 grams of fiber per serving

+ Fiber and the FDA




- A grain food product, fruit, or vegetable that is low fat and is a good source of dietary fiber (without fortification) may carry this claim:
- “Low fat diets rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors.”

+ Soluble Fiber and the FDA



- Food products containing 0.75g soluble fiber, per recommended amount customarily consumed, from oat bran, rolled oats, whole oat flour, oatrim, whole grain barley and dry milled barley, barley beta fiber, soluble fiber from psyllium husk that meet criteria set forth by the FDA may carry this claim:
- “Soluble fiber from foods such as [name of soluble fiber source, and, if desired, name of food product], as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [name of food product] supplies ___ grams of the [necessary daily dietary intake for the benefit] soluble fiber from [name of soluble fiber source] necessary per day to have this effect.”

Benefits of Dietary Fiber

Type	Component	Physiological effect	Food Sample
Insoluble Noncarbohydrate	Lignin Cellulose,	Increases fecal bulk Increases fecal bulk	Wheat bran, Whole grains Wheat products, All plants
Insoluble Carbohydrate	Hemicelluloses	Decreases intestinal transit time	Wheat, rye, rice, vegetables
Soluble Carbohydrate	Pectins, gums, mucilages, some hemicelluloses	Delays stomach emptying, slows glucose absorption, can lower blood cholesterol	Oats, Beans, Citrus 

+ Fiber and Cardiovascular Disease



- According to the Association of Nutrition and Dietetics, intake of 12-33 g fiber per day from whole foods may:
 - lower blood pressure
 - have beneficial effects on blood lipid levels (cholesterol)
 - reduce inflammation
- The beneficial effects of viscous fibers on total body cholesterol may be similar to statin drugs.

+ Fiber and Bowel Function



- Poorly fermentable fiber increases the weight of stool, normalizes bowel movements to one per day, and GI transit time to 2-4 days.
 - Some studies have indicated that as stool weight increases, colon cancer risk decreases.
 - Consuming enough fiber may prevent and / or treat diverticulitis and constipation.
- Fermentable fibers produce short-chain fatty acids, such as butyrate.
 - These fatty acids are an energy source for the colon, and may be protective against colon cancer.
- These foods are natural laxatives because of the indigestible carbohydrates and other compounds they contain:
 - cabbage, oatmeal porridge, rhubarb, honey, tamarinds, figs, prunes, raspberries, strawberries, stewed apples.

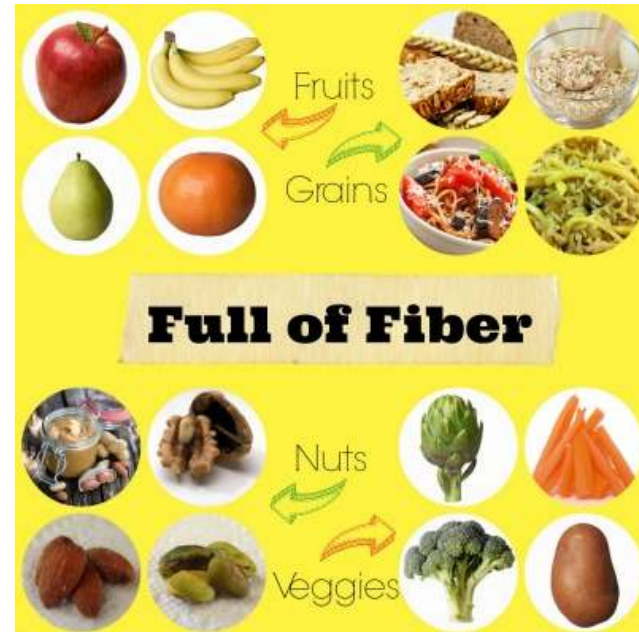
+ Fiber and **WEIGHT CONTROL**



- According to the Academy of Nutrition and Dietetics, weight control benefits from eating fiber may accrue with intakes from 20-27g per day, although evidence is limited.
 - High fiber foods contain fewer calories per weight than high fat foods. High fiber foods may decrease caloric intake by displacing high fat foods from the diet.
 - Increased chewing needed when eating high fiber foods may slow rate of intake and increase satiety (feeling of fullness)
 - Dietary fiber also may cause food to stay in the stomach longer also leading to a feeling of fullness.
 - Fiber may slow absorption of nutrients including fat and sugar.

+ Fiber and Diabetes

- According to the Academy of Nutrition and Dietetics, eating a diet that contains 30-50g fiber per day may help control blood sugar levels in diabetics, although evidence is limited. Also at very high levels, you may decrease absorption of other important micronutrients.
- This may be for the same reasons fiber controls weight: fiber rich foods move through digestion more slowly and absorption takes a longer period of time.



+ Fiber: Risks

- High intakes of viscous fibers may cause discomfort and flatulence because of the activity of bacteria in the gut.
- As fiber increases, so do fluid requirements.
 - Stool weight increases with increased fiber consumption thereby increasing the amount of water lost in the stool.

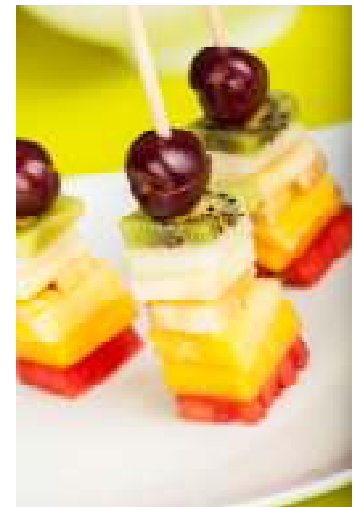


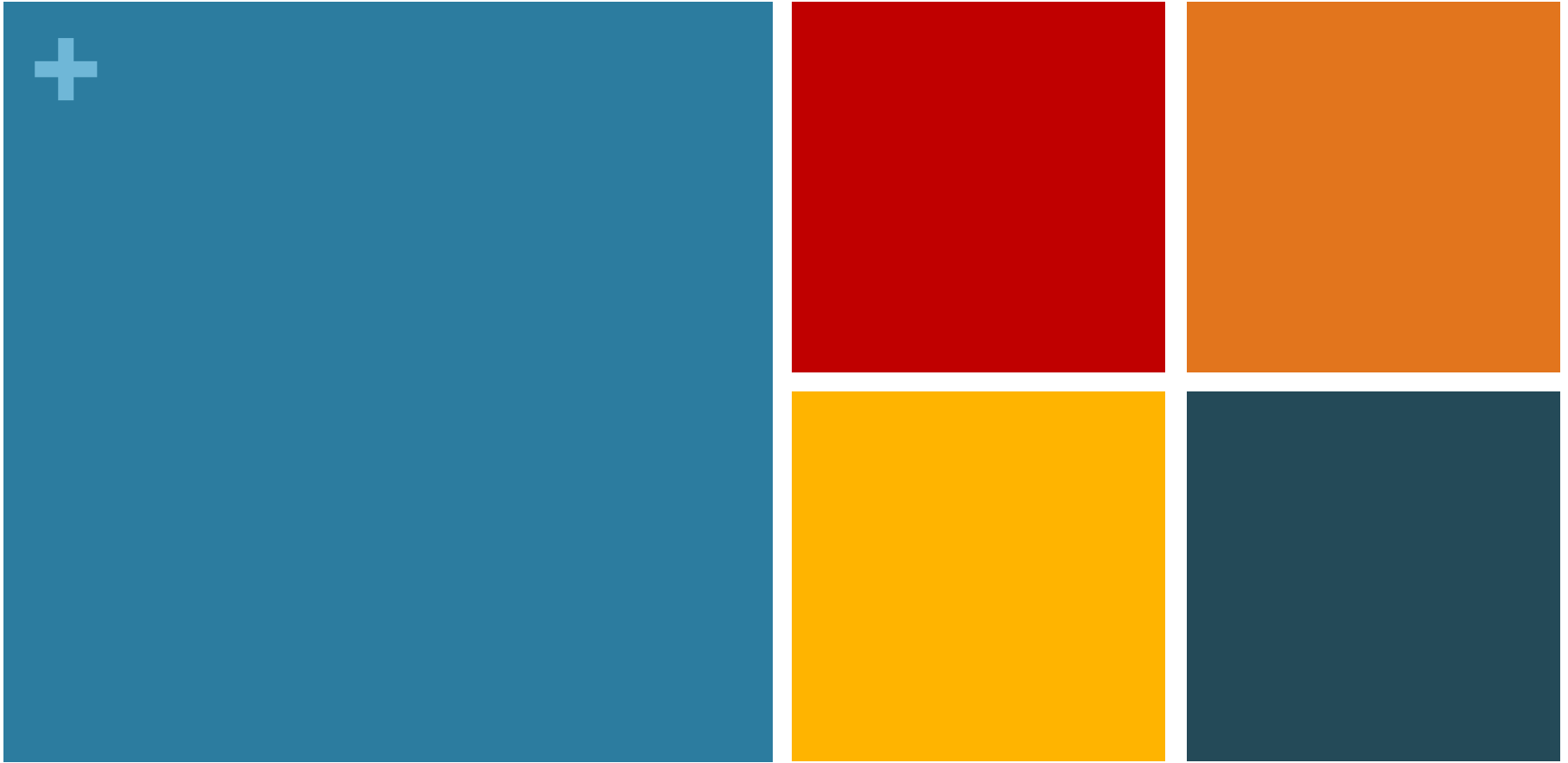
+ Fiber

Bottom Line



- Thorough review of evidence suggests that fiber from whole foods is protective against cardiovascular disease, weight gain, and diabetes.
- Fiber containing whole foods such as fruit, vegetables, whole grains and legumes also contain other compounds that may **synergistically** promote health.
 - Fiber added to food products may not be as beneficial.





Soy

+ Soy Introduction



- Soybeans are in the pea family and are source of high quality protein. They contain no cholesterol and are low in saturated fat. Soybeans are a good source of fiber, iron, calcium, zinc, and B vitamins.
 - Perhaps one of the most versatile foods, soy can be lightly processed (edamame) or made into products such as soy milk, tofu, and vegetarian meat and cheese replacements, among other foods.
 - Traditional Asian cuisine typically uses fermented soy.
- Soy contains polyphenols called isoflavones. Genistein, daidzein, and glycitein are types of isoflavones abundant in soy, but found in smaller quantities also in other foods. These isoflavones are also called phytoestrogens because of how they behave in the body.

Eilat-Adar S, Sinai T, Yosefy C, Henkin Y. Nutritional recommendations for cardiovascular disease prevention. *Nutrients*. Sep 2013;5(9):3646-3683.

+ Phytoestrogens Found in Soy



- Phytoestrogens are plant substances, not steroids, but have structural similarities to human estrogen and bind to the human estrogen receptor
- They can be used both to boost the effects of endogenous estrogen (estrogen made in your body) or reduce them depending upon the hormone status of the person eating them



Phytoestrogens Found in Soy



- When body estrogen levels are high they will compete for estrogen receptor sites with the more potent endogenous (within the body) hormones and thus perhaps moderate the estrogen response
- It has been suggested that “replacing” endogenous estrogens with less potent phytoestrogens might reduce the risk of developing breast cancer

+ Phytoestrogens Found in Soy



- Soy products contain a class of phytoestrogens known as isoflavones which includes the most active phytoestrogens, diadzein and genistein.
 - Although these compounds are found in other legumes, such as chickpeas, the levels in soybeans are much higher (2-4mg isoflavones per gram soy protein).
- There are other classes of phytoestrogens, namely the lignans, found in whole grains, fruits, vegetables, and flaxseed and the coumestans found in clover and alfalfa sprouts.
 - Generally have much less estrogenic activity than the soy isoflavones

Nieves JW. Skeletal effects of nutrients and nutraceuticals, beyond calcium and vitamin D. *Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA*. Mar 2013;24(3):771-786.



Isoflavones in Soy Ingredients

(including soybeans)



- Soybeans, defatted soy flours, soy protein concentrates, miso, tempeh, soy protein isolates, powders, bars, and texturized vegetable protein contain varying levels of isoflavones
- The amount of isoflavones in soy products depends upon the processing methods. Alcohol extraction or defatting lowers the final isoflavone content.
- Soy foods that contain isoflavones are:
 - Textured soy protein which is sometimes used in meat substitutes or used as partial replacement for meat in some meat products (used as 'meat stretchers') - around 5 mg total isoflavones per gram soy protein
 - Soy flour- 5 mg/g, Tofu – 2 mg/g, Soy milk – 2 mg/g, Soy sauce – none



Isoflavones in Soy Ingredients

(including soybeans)



- A typical American eats only about 1-3 mg of isoflavones per day compared to the 30-60 mg per day that is typical in Asian diets.

Nieves JW. Skeletal effects of nutrients and nutraceuticals, beyond calcium and vitamin D. *Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA*. Mar 2013;24(3):771-786



Soy

Bone Health



- It has been theorized that phytoestrogens in soy may help to maintain bone density in older women and reduce the risk of osteoporosis-related fractures of the wrists, vertebrae and hip in older women.
 - Women and men both get osteoporosis, but it occurs in women at an earlier age due to the decline in sex hormone output after menopause. Osteoporosis typically occurs late in life in men.
- Epidemiological studies suggest that women who eat relatively high amounts of soy have a lower risk of osteoporosis.
 - In a 4.5 year long study of 24,403 postmenopausal Chinese women, those who ate more than 13.26g of soy per day had a 36% lower risk of fracture than those with low dietary soy intake (less than about 5 g per day).

+ Soy: Bone Health



- *In vitro* studies with isolated bone cells indicate that genistein seems to reduce bone resorption by osteoclasts and to stimulate bone forming osteoblasts
- In animal studies, soybean feeding generally leads to increases in bone density, bone mass or other measure of bone health in female rats whose ovaries have been surgically removed (an animal model of the human postmenopausal state)
- *However*, clinical studies have failed to show a consistent benefit of soy isoflavones on bone health in postmenopausal women.

+ Soy: Cancer



- In vitro and animal studies suggest that the compounds genistein and daidzein found in soy may slow cancer growth and prevent tumor formation.
- However, clinical studies have failed to show a consistent link between soy and lower risks of breast, prostate, or stomach cancer prevention.
- Future research will determine if an individual's microbiome plays a role in soy's effects on cancer. Some studies indicate that individuals with a particular type of gut bacteria experience more cancer preventative benefits from eating soy than those who do not have this bacteria.
- See [AICR.org](https://www.aicr.org) foods that fight cancer

+ Soy: Cancer



- Although there have been concerns that the isoflavones in soy could be risky for survivors of estrogen receptor-positive type breast cancer, an analysis of current studies indicates that 1-2 servings of soy daily is safe.
 - One serving of soy:
 - 1 cup soy milk
 - ½ cup cooked soy beans
- Visit www.Aicr.org and search soy, foods that fight cancer, for updates on soy and cancer.



Soy

Cardiovascular Disease

- An analysis of 22 randomized clinical trials found that a range of soy protein from 25-135 g/day lowered LDL or non-HDL cholesterol by about 3% when compared to wheat, dairy, or other animal proteins.
- Although clinical trials have indicated little to no improvement in blood pressure or blood lipids from eating soy, researchers generally agree that eating soy foods instead of dairy and meat products could improve risk factors for cardiovascular disease.
 - This is because soy contains no cholesterol and is low in saturated fat.

Eilat-Adar S, Sinai T, Yosefy C, Henkin Y. Nutritional recommendations for cardiovascular disease prevention. *Nutrients*. Sep 2013;5(9):3646-3683.



+ Soy and the FDA



- The FDA has approved this health claim on products that contain at least 6.25g soy protein per recommended amount customarily consumed. The product must be low in saturated fat, cholesterol and total fat (except for those products made from whole soybeans that contain only the fat inherent in the whole soybean):
 - “25 grams of soy protein a day, as part of a low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [name of food] supplies __ grams of soy protein.”

US Food and Drug Administration.
<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm064919.htm>.
Updated January 2013. Accessed April 21, 2014.

+ Soy

Cardiovascular Disease



- Limit highly processed meats that contain soy components!
 - Some sausages, chicken nuggets, hot dogs, deli meats and commercially prepared meats may use soy. This does not improve the health of these products.
- People who eat processed meats containing soy components are at a 42% higher risk of CHD, according to an analysis of 5 separate studies.



Soy

BOTTOM LINE



- Soy foods only lower LDL (bad cholesterol) by an average of a few points.
 - It can lower LDL more if consumed in place of meat, cheese, or other sources of saturated or trans fats
- More research is needed on soy's capabilities of lowering the risks of breast cancer, delaying prostate cancer, possibly strengthening bones, or boosting brainpower.

+ Soy

BOTTOM LINE

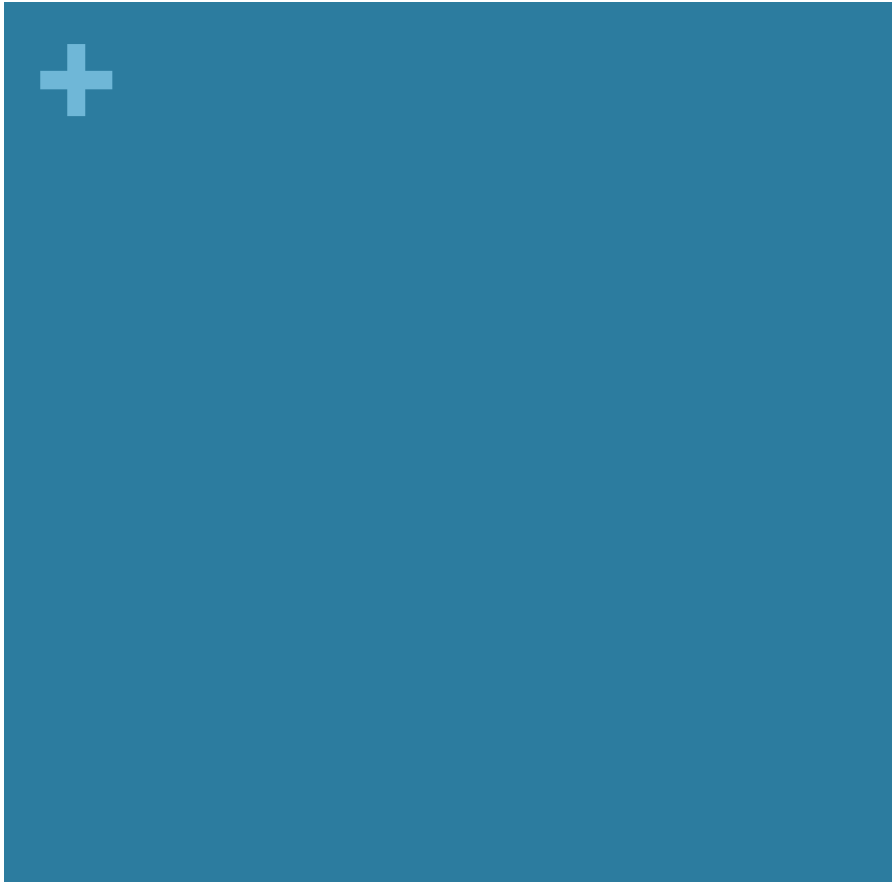


- For general guidelines, try no more than 50 to 70 milligrams of isoflavones a day
 - This is about 1 or 2 (8 oz.) cups of soy milk or 6 to 9 oz. of tofu
- Try edamame –you can buy it frozen and give it a quick steam or microwave it
- Highly processed snack foods may contain soybean oil, soy protein and soy flour. Adding soy to a foods high in saturated fat, sugar, or sodium does not make them healthful!
- ***It's never too late to start exercising to improve bone density.**

+ Soy



- If you're concerned about soy being genetically modified (GMO), choose either non-GMO soy or organic. All organic foods are NOT genetically modified. Read the labels.
- To learn more read: <http://www.superkidsnutrition.com/10-ways-for-kids-to-enjoy-soy-foods/>



Thank You!!