

International Food Information Council (IFIC) Foundation Functional Foods Component Chart

This chart is taken from the *IFIC Foundation Functional Foods Backgrounder*. For access to the full *Backgrounder* or for more information on functional foods, please visit: <http://www.ific.org/nutrition/functional/index.cfm>.

Examples of Functional Components *			
Class/Components	Source*	Potential Benefit	Tips for including Healthful Components in the Diet
Carotenoids			
Beta-carotene	carrots, pumpkin, sweet potato, cantaloupe	neutralizes free radicals, which may damage cells; bolsters cellular antioxidant defenses; can be made into vitamin A in the body	For beta-carotene rich french fries: thinly slice sweet potatoes and coat with olive oil or fat-free cooking spray, add spices to taste (pepper, rosemary, thyme), bake in 425-degree oven until golden brown on both sides (10-15 mins). Time-saver: buy pre-cut sweet potatoes in the frozen foods section.
Lutein, Zeaxanthin	kale, collards, spinach, corn, eggs, citrus	may contribute to maintenance of healthy vision	Freezing kale can bring out a sweeter, more flavorful taste. For an easy sautéed side dish try this simple recipe: add kale to skillet with oil and garlic, slivered almonds, and red pepper flakes. If kale doesn't top your list of food preferences, spinach, which provides the same health benefits, can be an easy substitute. Did you know that many multivitamin and mineral dietary supplements include lutein?
Lycopene	tomatoes and processed tomato products, watermelon, red/pink grapefruit	may contribute to maintenance of prostate health	Research shows lycopene is best absorbed by the body when consumed as tomatoes that have been cooked using a small amount of oil. This includes products such as tomato sauce and tomato paste. Try adding 1 cup tomato sauce to sautéed zucchini for a fun and colorful side dish! Don't like the bitter taste of grapefruit? Try sprinkling on a little sugar or a low-calorie sweetener before eating one to bring out the rich natural sweetness within.
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Dietary (functional and total) Fiber			
Insoluble fiber	wheat bran, corn bran, fruit skins	may contribute to maintenance of a healthy digestive tract; may reduce the risk of some types of cancer	Try adding a little dry wheat bran when making smoothies or muffins to bulk up the fiber content; this may help keep you full longer.
Beta glucan**	oat bran, oatmeal, oat flour, barley, rye	may reduce risk of coronary heart disease (CHD)	Jazz up your oatmeal with these tasty extras: 2 Tbsp peanut butter and jelly; cinnamon and pumpkin puree; slivered almonds and ½ C frozen berries. Instant oatmeal packets are easily stored in your desk drawer to have on hand when you missed breakfast at home or need a hearty afternoon snack to tide you over until dinner.
Soluble fiber**	psyllium seed husk, peas, beans, apples, citrus fruit	may reduce risk of CHD and some types of cancer	Try adding canned beans (black, pinto, or garbanzo) to your regular cuisine: layer them in a quesadilla, add to an omelet, or enjoy them cold in a mixed green salad.
Whole grains**	cereal grains, whole wheat bread, oatmeal, brown rice	may reduce risk of CHD and some types of cancer; may contribute to maintenance of healthy blood glucose levels	Did you know that popcorn is a great source of whole grains? Keep a few mini-bags in your desk drawer to heat up for a quick, low-calorie snack at the office. Also, try spicing up your popcorn with garlic powder and cinnamon, or rosemary and parmesan cheese. Yum! Are your kids picky eaters? Try making their next sandwich visually appealing: use one slice of white bread and one slice of whole grain bread, cut sandwich into four pieces, turn two sections to create a checker board effect.
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<i>Fatty Acids</i>			
Monounsaturated fatty acids (MUFAs)**	tree nuts, olive oil, canola oil	may reduce risk of CHD	Fill the cradle of your cupped hand to make portion-controlled snack-bags of mixed nuts of your choosing (almonds, pecans, etc). Throw in some dried fruit for an extra helping of fruit. Keep the bags on hand to grab on your way out the door for a quick and easy mid-morning or afternoon snack with healthful fats for your heart.
Polyunsaturated fatty acids (PUFAs) - Omega-3 fatty acids—ALA	walnuts, flax	may contribute to maintenance of heart health; may contribute to maintenance of mental and visual function	When cooking, try substituting flax seed oil in a recipe that calls for canola or olive oil 1-2 times a week.
PUFAs - Omega-3 fatty acids—DHA/EPA**	salmon, tuna, marine, and other fish oils	may reduce risk of CHD; may contribute to maintenance of mental and visual function	Salmon or tuna that is canned in water or in a shelf-stable pouch can make easy and affordable meals; add a few tablespoons of olive oil, season with pepper and thyme to enjoy on top of whole grain crackers or wrapped with tomatoes in a lettuce leaf.
Conjugated linoleic acid (CLA)	beef and lamb; some cheese	may contribute to maintenance of desirable body composition and healthy immune function	Bring Hawaii to your next cook-out by preparing these kebabs for the grill: alternate pineapple, beef, onions, and bell peppers on wooden skewers; season for your grilling pleasure with garlic powder, pepper, paprika, oil, and lime.

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Flavonoids			
Anthocyanins – Cyanidin, Delphinidin, Malvidin	berries, cherries, red grapes	bolsters cellular antioxidant defenses; may contribute to maintenance of brain function	For a cold treat, try frozen berries. They are also tasty additions to any yogurt, and can help to cool and flavor your oatmeal in the morning!
Flavanols - Catechins, Epicatechins, Epigallocatechin, Procyanidins	tea, cocoa, chocolate, apples, grapes	may contribute to maintenance of heart health	Make your own iced tea by pouring boiling water over 3-4 bags of your favorite tea; let the tea sit for 5 minutes, then pour over a pitcher of ice and fill to the brim with water; stir and refrigerate to chill. Enjoy with fresh squeezed lemon as desired.
Flavanones – Hesperetin, Naringenin	citrus fruits	neutralize free radicals, which may damage cells; bolster cellular antioxidant defenses	Squeeze ½ an orange and ½ a lemon into a small dish; add olive or flax oil, dashes of salt, pepper, and basil for a perfectly refreshing salad dressing. Rushed for time? You can get the same benefits from fresh orange or grapefruit juice.
Flavonols – Quercetin, Kaempferol, Isorhamnetin, Myricetin	onions, apples, tea, broccoli	neutralize free radicals which, may damage cells; bolster cellular antioxidant defenses	Caramelized onions make a sweet and tasty garnish to many main dishes. Sauté onions over low heat in oil until a deep gold color; add on top of prepared steak, chicken, or fish.
Proanthocyanidins	cranberries, cocoa, apples, strawberries, grapes, wine, peanuts, cinnamon	may contribute to maintenance of urinary tract health and heart health	Dice apples and simmer in water until soft, add to blender with dashes of cinnamon, puree. Enjoy as a spread on whole wheat toast or crackers!

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Isothiocyanates			
Sulforaphane	cauliflower, broccoli, broccoli sprouts, cabbage, kale, horseradish	may enhance detoxification of undesirable compounds; bolsters cellular antioxidant defenses	Keep frozen broccoli and cauliflower on hand for an easy dinner side dish: in a microwaveable bowl, cover frozen vegetables with paper towel and cook 1-1 ½ minutes. Add slivered almonds and cover with parmesan cheese, cook 30-60 seconds more or until the cheese melts and it's ready for the table!
Minerals			
Calcium**	sardines, spinach, yogurt, low-fat dairy products, fortified foods and beverages	may reduce the risk of osteoporosis	Add cooked spinach (1 minute in boiling water), canned artichokes and plain yogurt to blender or food processor; puree for a quality cracker spread or dip. Season to taste: try black pepper, basil and garlic powder.
Magnesium	spinach, pumpkin seeds, whole grain breads and cereals, halibut, brazil nuts	may contribute to maintenance of normal muscle and nerve function, healthy immune function, and bone health	Add pumpkin seeds to a stir-fry or sauté. You can also sprinkle a fish filet with seeds before baking to add extra flavor
Potassium**	potatoes, low-fat dairy products, whole grain breads and cereals, citrus juices, beans, banana	may reduce the risk of high blood pressure and stroke, in combination with a low sodium diet	Puree ripe bananas with crushed peanuts, portion into freezer cups to enjoy as a frozen "ice cream" treat! For extra indulgence, add some shavings of fresh chocolate as a topping.

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Minerals (continued)			
Selenium	fish, red meat, grains, garlic, liver, eggs	neutralizes free radicals which may damage cells; may contribute to healthy immune function	LOVE garlic? Perhaps you need some convincing. Roasting garlic gives it a rich, buttery flavor. Cut a full bulb of garlic crosswise to expose wrapped cloves; drizzle with olive/flax oil, season with salt/pepper, cover with aluminum foil to bake in 400-degree oven for 30 minutes or microwave on high (NO foil) for 1 minute, turn bulb upside down and cook 1 minute more. Delicious!
Phenolic Acids			
Caffeic acid, Ferulic acid	apples, pears, citrus fruits, some vegetables, coffee	may bolster cellular antioxidant defenses; may contribute to maintenance of healthy vision and heart health	Love your morning coffee? Good news - coffee is a powerful source of antioxidants. Pair it with apples and peanut butter for a powerful breakfast on the go.
Plant Stanols/Sterols			
Free Stanols/Sterols**	corn, soy, wheat, wood oils, fortified foods and beverages	may reduce risk of CHD	Get your free stanols/sterols from fortified foods such as bread containing "whole wheat flour", low-fat yogurt, and some cereals. Dietary supplements in soft-gel form that contain free stanols and sterols are also available and can provide similar benefits when used as part of a low-fat, low-cholesterol diet.
Stanol/Sterol esters**	stanol ester dietary supplements, fortified foods and beverages, including table spreads	may reduce risk of CHD	Many table spreads (butter or margarine alternatives) are now fortified with stanol and/or sterol esters. Other commercial products fortifying with stanols and sterols include some orange juices, yogurt beverages, chocolate, and granola bars. Be sure to check the product label and ingredient list to confirm the presence and amount of stanols and sterols.
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Polyols			
Sugar alcohols** - Xylitol, Sorbitol, Mannitol, Lactitol	some chewing gums and other food applications	may reduce risk of dental caries	Reduce your risk for dental caries and curb your appetite by chewing gum containing xylitol after eating.
Prebiotics			
Inulin, Fructo-oligosaccharides (FOS), Polydextrose	whole grains, onions, some fruits, garlic, honey, leeks, fortified foods and beverages	may improve gastrointestinal health; may improve calcium absorption	Several new food products are beginning to appear fortified with prebiotics, but did you know that you can also get prebiotics by simply adding honey to some of your routine meals? Try honey in your oatmeal or yogurt, drizzle it over a banana, spread it on your morning toast, or treat yourself to ½ a peanut butter and honey sandwich as a snack.
Probiotics			
Yeast, <i>Lactobacilli</i> , <i>Bifidobacteria</i> , and other specific strains of beneficial bacteria	certain yogurts and other cultured dairy and non-dairy applications	may improve gastrointestinal health and systemic immunity; benefits are strain-specific	Add probiotics into your diet by choosing low-fat yogurt: choose from a variety of flavored yogurts with probiotics for a quick and tasty snack, 30-second smoothie TO-GO: 6-8oz yogurt, 6oz orange juice, 1 Tbsp honey, ½ banana, and ice. Blend gently and pour into a container for the person on the go. For a healthy breakfast snack try topping pancakes with flavored yogurt and fresh fruit like strawberries and bananas.
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Phytoestrogens			
Isoflavones - Daidzein, Genistein	soybeans and soy-based foods	may contribute to maintenance of bone health, healthy brain and immune function; for women, may contribute to maintenance of menopausal health	Not a fan of tofu? Try “hiding” it in some of your favorite recipes. Get your isoflavones by getting soft, silken tofu and adding it to the cheese sauce mixture used to make lasagna. Other recipes that work well with tofu additions include quiches, veggie dips, quesadillas, chili, chocolate mousse, even baked goods!
Lignans	flax, rye, some vegetables	may contribute to maintenance of heart health and healthy immune function	Add flax seeds, whole or ground, to a smoothie or a recipe for baked goods that can pack a lignan punch! You can also try substituting rye bread for your usual bread of choice at home once in a while; or when eating at a restaurant and offered a choice of bread, opt for rye. Did you know that most Reuben sandwiches are made with rye bread?
Soy Protein			
Soy Protein**	soybeans and soy-based foods	may reduce risk of CHD	Soybeans are also called “edamame” in many Asian cuisine restaurants; try ordering a plate to share before your meal arrives. When cooking at home, look for edamame in the frozen section to easily prepare as a healthy snack or party sampler; experiment with seasonings for additional taste—red pepper flakes add the perfect amount of heat! If you like your foods cold, edamame that has been cooked and removed from the pod adds great flavor and extra protein to any salad.
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Sulfides/Thiols			
Diallyl sulfide, Allyl methyl trisulfide	garlic, onions, leeks, scallions	may enhance detoxification of undesirable compounds; may contribute to maintenance of heart health and healthy immune function	Scallions, or “green onions,” are milder than traditional onions and are commonly added at the last minute to salads or cooked sauces as a garnish. Try incorporating scallions into your diet by thinly chopping the green stalks and adding them to mashed potatoes, cold pasta salad, tuna salad, or canned soups! Leeks can also be an easy substitute, but more commonly used in soups.
Dithiolthiones	cruciferous vegetables	may enhance detoxification of undesirable compounds; may contribute to maintenance of healthy immune function	Broccoli and cauliflower are the more commonly known cruciferous, or crossed shaped, vegetables that we can eat, but did you also know that varieties of cabbage, bok choy, brussel sprouts, kale, and wasabi, among others are also sources of dithiolthiones? Bok choy is great in any stir-fry or by itself. To cook: separate the white stem from the leaves and chop into 1”-thick pieces. Add to oil in skillet on medium-high heat, sauté 3 minutes, add the leaves and ½ cup of water or vegetable stock, stir until the leaves are wilted and cooked (about 5-10 minutes). Season to taste and enjoy!
Vitamins			
A***	organ meats, milk, eggs, carrots, sweet potato, spinach	may contribute to maintenance of healthy vision, immune function, and bone health; may contribute to cell integrity	If you are not a fan of boiled or raw carrots, try buying the larger carrots and slice them lengthwise into wide strips: add them to the grill after lightly brushing with oil and season with fajita seasoning or other spices to give them a unique BBQ flavor.
<p>*Examples are not an all-inclusive list **FDA approved health claim established for component. ***Preformed vitamin A is found in foods that come from animals. Provitamin A carotenoids are found in many darkly colored fruits and vegetables and are a major source of vitamin A for vegetarians.</p>			
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Class/Components	Source*	Potential Benefit	Tips for including Healthful Components in the Diet
Vitamins (continued)			
B1 (Thiamin)	lentils, peas, long grain brown rice, brazil nuts and certain fortified breakfast cereals	may contribute to maintenance of mental function; helps regulate metabolism	If you are still unsure about making the transition to long-grain brown rice, start slow and create a ½ white rice and ½ brown rice mixture. Think about adding dried cranberries and slivered almonds to the rice mix as well for appealing color and a little sweet flavor to compliment the dense rice.
B2 (Riboflavin)	lean meats, eggs, green leafy vegetables and certain fortified breakfast cereals	helps support cell growth; helps regulate metabolism	Get lots of vitamin B2 by bulking up a homemade sandwich made on a whole wheat bread with lean-cut deli meat and double-stacked green and red leaf lettuce or spinach. The extra greens will give your sandwich that mouthwatering crunch in every bite—also adding fiber to keep you satisfied longer!
B3 (Niacin)	dairy products, poultry, fish, nuts, eggs and certain fortified breakfast cereals	helps support cell growth; helps regulate metabolism	For a spicy twist on chicken, grill chicken breasts and cut into strips, toss in your favorite hot sauce and serve with celery—healthful “chicken wings” for the next football party!
B5 (Pantothenic acid)	organ meats, lobster, soybeans, lentils and certain fortified breakfast cereals	helps regulate metabolism and hormone synthesis	Looking for a healthful crunch? Try dried soy nuts with dried fruit for a fiber-rich, vitamin B5-friendly snack. Soy nuts are easily added to yogurts, oatmeal, salads, stir-fries, chicken bakes, and much more.
B6 (Pyridoxine)	beans, nuts, legumes, fish, meat, whole grains and certain fortified breakfast cereals	may contribute to maintenance of healthy immune function; helps regulate metabolism	Legumes come in all shapes and varieties; to add more vitamin B6 to your diet, try snacking on sugar snap peas to change up the routine of baby carrots once or twice a week. Keep frozen green beans in hand for a quick side dish or snack: boil beans 2-3 minutes until tender but firm. Season with oil, soy nuts or sunflower seeds, basil, salt and pepper.
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Vitamins (continued)			
B9 (Folate)**	beans, legumes, citrus foods, green leafy vegetables and fortified breads, cereals, pasta and rice	may reduce a woman's risk of having a child with a brain or spinal cord defect	Many breads and cereals are fortified with folate, check the nutrition facts panel to be sure. To get folate in your diet with whole-foods, think about buying canned or raw beans; not only are they affordable, but they can also be easy to prepare. Try this culturally charged take on lentils: sauté chopped onions until a deep golden brown, add drained, canned or cooked lentils, curry powder, salt and pepper; stir in ½ C water and let simmer for 10 minutes. Serve over long-grain brown rice (or rice of your choice).
B12 (Cobalamin)	eggs, meat, poultry, milk and certain fortified breakfast cereals	may contribute to maintenance of mental function; helps regulate metabolism and supports blood cell formation	Hard-boiled eggs can be healthful, easy meal additions for the person on the go. Boil 6-8 eggs over the weekend to store as a time-saver in the mornings during the week. For an easy fail-proof method: add water over eggs placed on the bottom of a stove pot, add 1-2 tsp vinegar (to prevent cracking), place on high heat. When water is at a rolling boil (big bubbles), cover and turn off heat. Let sit for 30 minutes. Remove the eggs from the water and store in the refrigerator until ready to enjoy!
Biotin	liver, salmon, dairy, eggs, oysters and certain fortified breakfast cereals	helps regulate metabolism and hormone synthesis	Do you buy your lunches out? Instead of the grilled chicken or steak on a salad, try the salmon at least once a week. Think about keeping a can or pouch of salmon in your desk drawer to have on hand the next time someone brings bagels and cream cheese to the office—WOW your coworkers with your fancy and more healthful take on breakfast!

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Vitamins (continued)			
C	guava, sweet red/green pepper, kiwi, citrus fruit, strawberries, fortified foods and beverages	neutralizes free radicals which may damage cells; may contribute to maintenance of bone health and immune function	A great way to boost your vitamin C is through a fruit smoothie. Save money and preparation time by using frozen fruit. Canned fruit in lite syrup can also be cost-friendly and nutritious—try adding canned fruit to low-fat or fat-free cottage cheese or yogurt.
D	sunlight, fish, fortified foods and beverages, including milk, juices and cereals	helps regulate calcium and phosphorus; helps contribute to bone health; may contribute to healthy immune function; helps support cell growth	If choosing to get your vitamin C from a morning glass of orange juice, did you know you could also be getting calcium and vitamin D? Now, more milk and juice products around the supermarket are fortified with vitamin D and calcium. Make sure to check the label before making your next purchase. Dietary supplements of vitamin D are also a great way to add vitamin D to your diet.
E	sunflower seeds, almonds, hazelnuts, turnip greens, fortified foods and beverages	neutralizes free radicals, which may damage cells; may contribute to healthy immune function and maintenance of heart health	Raw and chopped hazelnuts can make excellent additions to vegetable sautés, pancake batter, and frozen yogurt. Sunflower seeds in the shell can be a good alternative or addition to taking peanuts to sporting events. Unshelled sunflower seeds are great as salad toppers; look for them at the end of the salad bar line the next time you go.
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