

Reducing the Risk of CVD

Functional Foods Can Lower the Bad Cholesterol While Raising the Good to Improve Cardiovascular Health

By Megan Tempest, RD



Most of us eat functional foods every day, such as when we sprinkle iodized salt on a hot baked potato, enjoy a hearty sandwich made with nutrient-enriched bread, or start the day with a cold glass of calcium-fortified orange juice. While all foods are “functional” to an extent, the term implies a health benefit beyond the mere provision of calories or nutrients.

The Academy of Nutrition and Dietetics (the Academy) describes functional foods as whole, fortified, enriched, or enhanced foods that have a potentially beneficial effect on health when consumed as part of a varied diet at effective levels on a regular basis. Concerning cardiovascular disease prevention, certain foods may reduce the harmful LDL cholesterol in the blood, raise levels of the good HDL cholesterol, lower blood pressure, stabilize heart rhythms, and even protect the lining of our arteries. Jeannie Gazzaniga-Moloo, PhD, RD, a national spokesperson for the Academy, believes that while functional foods are no magic bullet, “There certainly appears to be benefits to adding them to your daily diet to prevent cardiovascular disease.”

This article will discuss the major categories of functional foods that can prevent cardiovascular disease (CVD) and share tips that will help your clients incorporate those foods into their diet.

Fruits and Vegetables

It’s commonly accepted that the routine consumption of fruits and vegetables—abundant in phytochemicals, antioxidants, and fiber—protects against CVD. Flavonoids, which are plant-based phytochemicals such as flavonols, and proanthocyanidins, occur naturally in many foods such as onions, tomatoes, berries, apples, and cabbage. In February, McCullough and colleagues reported in the *American Journal of Clinical Nutrition* that the consumption of flavonoids is associated with a lower risk of death from cardiovascular disease and that even relatively small amounts of flavonoid-rich foods may be beneficial. Anthocyanins, a class of flavonoids found abundantly in blueberries, cranberries, raspberries, cherries, eggplant, and purple cabbage, have been shown to enhance endothelial function and suppress inflammation that may lead to CVD.¹

Janet Bond Brill, PhD, RD, LDN, author of *Prevent a Second Heart Attack*, praises the heart-healthy virtues of the olive fruit in the form of good-quality extra-virgin olive oil (EVOO). Brill says EVOO is rich in oleic acid, a monounsaturated fat that’s proven to stop LDL cholesterol oxidation and ward off CVD. “We know heart disease is an inflammatory condition caused by oxidation of LDL,” Brill explains. “By preventing this oxidation, you’re one step ahead of the game.”

Additionally, Brill emphasizes that by making EVOO your main fat source, you increase your body’s levels of the antioxidant vitamin E, which in turn fights free radical damage and minimizes LDL oxidation.

Nicknaming them “Mother Nature’s medicine chest,” Brill tells her clients to enjoy a rainbow of colorful vegetables, from dark leafy greens to cruciferous veggies such as broccoli and cauliflower to dark red and purple varieties, including eggplant and beets. “By consuming throughout the day a plethora of these beautiful veggies,” Brill explains, “you can boost your defenses against heart disease by increasing your body’s antioxidant level and keeping it up throughout the day, thereby taking a major step in heart disease prevention.”

And the same rule applies to fruits. “Fruits increase your body’s antioxidant levels, which is proven to ward off oxidation of LDL and also protect against endothelial dysfunction that promotes atherosclerosis,” Brill notes.

Legumes

Encompassing various beans, peas, and lentils, legumes are mainstays of a heart-healthy diet. They provide low-fat, plant-based protein along with fiber and a wide array of heart-healthy nutrients. Legumes are abundant in soluble fiber, which has been shown to help reduce blood levels of atherosclerotic LDL cholesterol, according to the American Heart Association (AHA).

Banana-Berry Smoothie

Serves 2

Ingredients

- 1 ripe banana, sliced
- ½ cup raspberries, fresh or frozen
- ¼ cup blueberries, fresh or frozen
- ½ cup unsweetened orange juice
- 1 cup low-fat, sugar-free, plain yogurt (no additives)

Directions

1. Place ingredients in a blender, and blend until smooth.
2. Serve immediately

Nutrient Analysis per serving

Calories: 140; Total fat: 0.5 g; Protein: 6 g; Total carbohydrate: 29 g; Dietary fiber: 3 g; Cholesterol: 0 mg; Sodium: 75 mg

RECIPE COURTESY OF CLEVELAND CLINIC WELLNESS INSTITUTE AND LIFESTYLE 180; [HTTP://CLEVELANDCLINIC.ORG](http://clevelandclinic.org). EXECUTIVE CHEF JIM PERKO



HEART-HEALTHY MYPLATE MEALS

With the introduction of MyPlate last year, the USDA presented the public with a visual reference for healthful eating. Here are three MyPlate meals, provided by our experts, comprised of delicious and heart-healthy functional foods.

Jeannie Gazzaniga-Moloo's Heart-Healthy Breakfast

- Oatmeal sprinkled with 1 tsp of ground flaxseed
- 1 small banana or ½ cup of blueberries
- 1 cup of skim milk, ½ cup of orange juice, and brewed coffee



Joan Salge Blake's Heart-Healthy Lunch

- Vegan bean chili
- Whole grain brown rice
- Green salad with veggies and fruit



Janet Bond Brill's Heart-Healthy Dinner

- Wild salmon cooked with garlic, lemon, and dill
- Quinoa salad with walnuts and currants (see recipe on page 39)
- Lightly steamed broccoli with extra-virgin olive oil (EVOO) and garlic
- Fresh spinach salad with orange slices and an EVOO-based vinaigrette
- 1 glass of soymilk
- Dessert—1 glass of red wine and a piece of dark chocolate (based on information from the Cleveland Clinic)



Brill points to soy as one of the ultimate health foods for CVD prevention. “For the sake of your heart, eat soy,” Brill says. Best consumed in its natural form, such as edamame or tempeh, Brill explains, “Soy lowers LDL a bit and is high in heart-healthy plant protein, antioxidants, fiber, and estrogenlike compounds.”

Eating legumes can offer the side benefit of replacing less healthful foods. Choosing plant-based protein instead of animal protein is a win-win situation in terms of CVD prevention, Brill says. “By choosing plant protein, you get much more bang for your buck. You’re getting amino acids, fiber, minerals, iron, and antioxidants, and you’re getting a food with bonus nutrients that boost your body’s antioxidant levels, lower cholesterol, and provide folate, which is known to lower homocysteine—high levels of which are a risk factor for CVD—all this for just pennies on the dollar. With animal protein, you’re getting the excess baggage of saturated fat and cholesterol and more calories.”

Joan Salge Blake, MS, RD, LDN, author of *Nutrition & You* and a media spokesperson for the Academy, recommends her clients choose beans instead of meat, fish, and poultry because they’re inexpensive, offer a healthful source of plant-based protein, and are high in cholesterol-lowering soluble fiber. And beans are easy to prepare. “It’s just a matter of opening the can and making your pasta with beans instead of meat or adding them to a salad,” Salge Blake says. “They’re a very heart-healthy and economical way for Americans to change their diet in a positive way.”

Fish

High in protein, low in saturated fat, and loaded with omega-3 fatty acids, the AHA recommends Americans consume at least two servings of fatty fish per week. Omega-3 fatty acids are believed to benefit the heart of healthy people as well as those at high risk of or who already have CVD. Consuming fish rich in omega-3s may decrease the risk of cardiac arrhythmias, which can lead to sudden death, decrease triglyceride levels, slow the growth rate of atherosclerotic plaque, and modestly reduce blood pressure, according to the AHA. Results of a large prospective cohort of healthy young women aged 15 to 47, published by Strøm and colleagues in the January issue of *Hypertension*, revealed that people with little or no intake of fish and omega-3 fatty acids are at increased risk of developing CVD.

Brill agrees that fatty fish consumption is remarkably beneficial and strongly recommends wild salmon, which she says works wonders for cardiovascular health by targeting what’s known in the medical arena

Impacts of COOKING OIL on Heart Health

Cholesterol is keeping us up at night – nearly 60 percent of Americans worry about it. There may be reason to, as approximately 79 million Americans suffer from heart and blood vessel diseases;¹ high cholesterol is one of the major risk factors leading to heart disease, heart attack and stroke.

Corn oil contains the highest amount of naturally occurring plant sterols per serving compared to any other cooking oil.

When it comes to choosing food, most people think grains, vegetables and fruit can help control their cholesterol levels.² What many people don’t realize is that choosing the right cooking oil can also have an important impact on heart health.³

In addition to containing polyunsaturated and monounsaturated fats, which may help lower cholesterol⁴, cooking oils contain plant sterols, which can help reduce the body’s absorption of cholesterol. This, in turn, can lower LDL cholesterol.⁵ But not all cooking oils are created equal. Corn oil contains the highest amount of naturally occurring plant sterols per serving compared to any other cooking oil – four times as many plant sterols as olive oil and 40 percent more than canola oil.

THE COOKING OIL COMPARISON⁶

	CORN	OLIVE	CANOLA
Serving Size	1 Tbsp (14g)	1 Tbsp (14g)	1 Tbsp (14g)
Phytosterols (mg)	132	30	94
Calories	120	119	124
Total Fat (g)	14	14	14
Saturated Fat (g)	2	2	1
Trans Fat (g)	0	0	0
Polyunsat. Fat (g)	7	1	4
Monounsat. Fat (g)	4	10	9
Cholesterol (mg)	0	0	0

¹American Heart Association http://www.heart.org/dlc/groups/heartpublic/@wcm/@hcm/documents/downloadable/ucm_300313.pdf ²Research was conducted online using Synovate’s omnibus service, eNation. Each eNation wave conducts 1,000 U.S. consumer interviews (500 male, 500 female) that are geographically and demographically reflective of the U.S. adult population. 818 interviews were conducted among cooking oil users. Results for these 818 respondents have a confidence interval of +/- 3.4% at the 95% level. Interviewing occurred July 19-21, 2011. ³Heart healthy benefits can be achieved by using Mazola oils instead of cooking oils higher in saturated fat such as butter or shortening. To achieve such benefits, Mazola oils should replace a similar amount of higher saturated fat oil and not increase the total number of calories you eat in a day. ⁴American Heart Association - http://www.heart.org/HEARTORG/Conditions/Cholesterol/Prevention/treatmentofHighCholesterol/KnowYourFats_UCM_305028_Article.jsp ⁵FDA 2000, 2010; Wu et al. 2009; Demerly et al. 2008; Ellegard et al. 2008; Mensink et al. 2010 - <http://www.fda.gov/food/guidancecomplianceregulatoryinformation/GuidanceDocuments/FoodLabeling/Nutrition/FoodLabelingGuidance/ucm064919.htm> ⁶USDA National Nutrient Database for Standard Reference Release 23 (2010). ⁷USDA and USDHHS 2010. ⁸Bruckert and Rosenbaum 2011 <http://www.prefer.pitt.edu/Lowering%20LDL-cholesterol%20through%20diet%20potential%20role%20in%20the.pdf> ⁹FDA 2000, 2010; Wu et al. 2009; Demerly et al. 2008; Ellegard et al. 2008; Mensink et al. 2010 - <http://www.fda.gov/food/guidancecomplianceregulatoryinformation/GuidanceDocuments/FoodLabeling/Nutrition/FoodLabelingGuidance/ucm064919.htm> ¹⁰Ling and Jones 1995 - <http://www.accessdata.fda.gov/scripts/cdr/cdr/gas/notices/gm000061.pdf> ¹¹Normen et al. (2002); Ryan et al. (2007); USDA database 2010. http://www.ars.usda.gov/main/site_main.htm?modecode=12-35-45-00, The Tale Tudorancea Bulletin http://www.titudorancea.com/z/foods_by_content_of_phytosterols.htm

For more information on plant sterols visit, **AboutPlantSterols.com**

What are plant sterols?

Plant sterols, also known as phytosterols, are plant-based micro-nutrients naturally present in fruits, vegetables, nuts, seeds, cereals, legumes and vegetable oils.⁷

How do plant sterols work?

Plant sterols are chemically similar to cholesterol and, due to this nearly identical structure, plant sterols compete with cholesterol for absorption.⁸

Clinical studies indicate that, when consumed as part of a diet low in saturated fat and cholesterol, plant sterols can help reduce the body’s absorption of cholesterol, which, in turn, can lower LDL blood cholesterol.⁹

How many plant sterols do you need?

To get the maximum cholesterol-lowering benefits, experts recommend consuming between 1,500 – 3,000 mg of plant sterols per day. Most Americans get approximately 250 mg of plant sterols per day from the foods they consume.¹⁰



Mazola® and WomenHeart have partnered to create the “Set a Healthier Table” program encouraging Americans to take a pledge to set a healthier table as a way to manage their family’s cholesterol.

For every pledge made, Mazola is donating \$1 (up to \$50,000) to WomenHeart to encourage women to be screened for cholesterol and help fund heart disease education and patient advocacy programs.

Plant Sterol Content of Select Foods¹¹

FOOD	Plant Sterols (mg)	Plant Sterols (mg)	Serving Size
Corn oil	968	132	1 Tbsp (14 g)
Peanuts	220	62	1 oz (28 g)
Pistachios	213	61	1 oz (28 g)
Chick peas	204	265	130 g
Wheat bran	200	58	½ cup (29 g)
Soybeans, raw	161	299	1 cup (186 g)

About WomenHeart: WomenHeart, The National Coalition for Women with Heart Disease, is the nation’s only patient centered organization serving the 42 million American women living with or at risk for heart disease – the leading cause of death in women. For more information about WomenHeart, visit www.womenheart.org.

as the “trilogy of vulnerability”—vulnerable plaque, vulnerable blood, and vulnerable heart muscle prone to electrical disturbances like arrhythmias. “The omega-3 fat in salmon targets all three in the trilogy—it stabilizes vulnerable plaque and prevents arrhythmia,” Brill says. “It also lowers our triglycerides and acts as an anti-inflammatory and as a blood thinner so our blood is less likely to clot.”

“We know that regularly eating fatty fish can reduce your risk of dying prematurely from heart disease,” Salge Blake says, “but there’s another reason why the AHA recommends two meals per week of fatty fish to benefit heart health. When we choose to eat fish, we know we’re getting a food that’s low in unhealthful saturated fat, is a great source of protein, and is potentially displacing another less healthful protein source such as fatty meat or poultry with skin. So you’re getting two for the price of one in terms of heart health benefits.”

Whole Grains

For a good source of dietary fiber, along with nutrients such as B vitamins, iron, vitamin E, polyphenols, magnesium, and selenium, the AHA recommends Americans consume six to eight servings of whole grains per day. Oats in particular provide significant cardiovascular benefits due to their high content of the soluble fiber beta glucan, which is believed to reduce LDL cholesterol. Brill considers oats to be a “power food” in terms of heart health for not only their content of beta glucan but also for

a unique antioxidant known as avenanthramide, which may lower CVD risk by reducing LDL cholesterol, total cholesterol, and triglycerides.²

To ramp up clients’ whole grain intake, Gazzaniga-Moloo encourages switching out refined white grains for whole grains whenever possible. “Any time you have white rice, try brown rice instead; or instead of white pasta, have whole grain pasta whenever possible. So you’re not making a major change. You’re simply switching out a less healthful item for a heart-healthy whole grain option.”

Nuts and Seeds

Nuts are rich in heart-healthy fats, antioxidants, phytosterols, protein, and fiber and are thus key players in CVD prevention. Large studies have shown that the regular consumption of nuts is associated with a reduced risk of CVD and type 2 diabetes, a known risk factor for CVD.³

Salge Blake encourages her clients to choose nuts at snack time: “They’re high in protein and fiber, therefore they make a great afternoon snack that can increase satiety. But a little goes a long way—the key is sticking to a portion size of approximately 1 oz vs. having a whole jar of nuts.”

Brill praises walnuts and flaxseeds for their exceptional benefits for cardiovascular health. Walnuts aren’t only high in fiber and antioxidants such as vitamin E, they also contain the highest amount of the omega-3 fatty acid alpha-linolenic acid

(ALA) of all nuts. “We know that people who eat diets high in ALA can reverse and prevent cardiovascular disease,” Brill says.

Flaxseeds also are loaded with heart-healthy ALA. A study by Bassett and colleagues, published in the December 2011 issue of the *American Journal of Physiology-Heart and Circulatory Physiology*, found that adding ground flaxseed to the diet can inhibit the artery-clogging action of cholesterol and hydrogenated trans fatty acids known to promote coronary heart disease. Sprinkling ground flaxseed on oatmeal for breakfast or mixing a tablespoon into a cup of yogurt or a fruit smoothie are simple ways to increase ALA intake.

Plant Sterols and Stanols

When talking about functional foods that prevent CVD, plant sterols and stanols definitely deserve mention. These plant-based substances reduce CVD risk by blocking the absorption of cholesterol in the small intestine, which lowers LDL cholesterol levels by 6% to 15% without lowering levels of HDL cholesterol. Their consumption is believed to be safe and doesn’t appear to interfere with the action of cholesterol-lowering medications such as statins.⁴

Gazzaniga-Moloo supports incorporating plant stanols into a heart-healthy diet: “The research is pretty convincing that bringing plant stanols into your diet is cardioprotective. If you’re looking for a spread on your toast, use whole grain bread and

reach for margarine with plant stanols added to it. While they occur naturally to a degree in certain foods, some people will find it challenging to eat enough of those foods to get an adequate amount, so these products can help.”

Heart-Healthy Beverages

While the research is somewhat controversial, certain drinks such as red wine, tea, and coffee may reduce CVD risk. Given its high content of catechins (a group of flavonoids), green tea may protect against death from all causes, especially CVD.⁵ A March 2011 study by Wang and colleagues, published in the *American Journal of Clinical Nutrition*, sought to find an association between black and green tea consumption and coronary artery disease (CAD). No significant cardioprotective benefit was reported from black tea; however, a 1-cup per day increase in green tea consumption was associated with a 10% decrease in the risk of developing CAD.

Flavonols in coffee have generated buzz due to tentative research suggesting that regular coffee consumption may cut CVD risk. It’s been reported that drinking 2 to 4 cups of coffee per day (no more, no less) may reduce heart disease risk by about 20%.⁶ Sugiyama and colleagues reported in the May 2010 issue of the *Journal of Nutrition* that coffee may demonstrate favorable effects on mortality from CVD, especially with regard to coronary heart disease in women.

Brill believes that the polyphenols in red wine (resveratrol,

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procyanidins, quercetin) can indeed boost your heart disease defense system, supporting the recommendation that one glass of red wine per day for women and two for men can be beneficial.

So should dietitians recommend these heart-healthy beverages to their clients for the sake of staving off CVD? Not yet, Gazzaniga-Moloo says: "The research behind functional beverages has yet to pan out, so we're not ready to actually recommend that our clients drink beverages such as coffee or green tea because of proven health benefits for the heart."

A review by Di Castelnuovo and colleagues, published in January, reported a similar conclusion: "Although regular consumption of moderate quantities of coffee and (green) tea seems to be associated with a small protection against CAD, results from randomized clinical trials about their beneficial effects are less evident."⁷

Expert Takeaways

Dietitians can agree that certain foods may significantly enhance cardiovascular health, but what remains unequivocally true is that no single food will prevent CVD. "It's not just about these individual functional foods, rather the whole diet," Salge Blake says. "We have to consider a plant-based diet that's rich in fruits and vegetables, low in saturated fat, and includes fish, physical activity, social support, drinking plenty of water, and being lean."

The opportunity is vast for dietitians to help people live longer, healthier lives by eating a cardioprotective diet. Despite the existence of pharmaceutical drugs such as statins, which have proven benefits of lowering LDL cholesterol, Brill notes that these drugs alone don't adequately prevent CVD. "Statin therapy doesn't eliminate CVD risk because it only targets LDL cholesterol," Brill explains. "The medical world hasn't come up with a pharmaceutical agent that can raise HDL significantly—Mother Nature has."

Brill encourages other dietitians and healthcare practitioners to teach their patients and clients that diet and lifestyle modifications can be extremely effective in warding off CVD. "We should be pushing these lifestyle changes because we know they work. Heart attack and stroke is the leading cause of death worldwide, but largely a preventable condition."

— Megan Tempest, RD, is a freelance writer based in Colorado.

For references, view this article on our website at www.TodaysDietitian.com.



Chef Keith Blauschild's Quinoa With Walnuts and Currants

Serves 6

Rinse the quinoa in a fine-mesh strainer with cool running water before cooking to remove the saponin, a natural coating on the quinoa that can be an irritant to the stomach if not removed. Some quinoa is sold prerinsed.

Ingredients

- 1 cup quinoa, rinsed
- 2 cups reduced-sodium chicken or vegetable broth
- ¼ cup dried currants
- ½ cup chopped walnuts, toasted
- ¼ cup finely sliced scallions, green and white part (2 thin scallions)

Directions

1. In a saucepan, bring the quinoa and broth to a boil.
2. Add the currants, cover and reduce heat to low. Cook for 15 minutes. Turn off the heat, leave covered, and let sit for 5 minutes.
3. After 5 minutes, open the pan and lightly fluff the quinoa with a fork to separate the grains. Gently stir in the walnuts and scallion. Serve warm or at room temperature.

Nutrient Analysis per ½-cup serving

Calories: 194; Fat: 8 g; Cholesterol: 0 mg; Sodium: 192 mg; Total carbohydrate: 26 g; Dietary fiber: 3 g; Sugars: 4 g; Protein: 7 g

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