

Foods and Supplements to Lower Cholesterol

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Reasons People Choose Non-Pharmacologic Treatment of High Cholesterol

- ▶ 1. Intolerable adverse effects of drugs (myalgias - muscle ache, fatigue, gastrointestinal issues)
- ▶ 2. Allergic/adverse reactions to drugs (liver, muscle, rash)
- ▶ 3. Perceptions of adverse effects of drugs
- ▶ 4. Drug-drug interactions
- ▶ 5. Personal preference for nutritional approaches and nutritional supplement therapies

Drug-Free Option



- ▶ Millions now taking prescription statin drugs may wish to use diet rather than medications as the **primary prevention** to control serum cholesterol
- ▶ Many people don't like taking meds
- ▶ The fewer the better, and **the lower the dosage, the better**
- ▶ Some experience negative side effects from statins: **muscle pain, memory loss, elevated liver enzymes, higher risk of diabetes**

Drug-Free Option



- ▶ As the guidelines of LDL levels drop lower and lower (for some as low as 70) dietary options will become **increasing important**
- ▶ Many patients prefer a **combination statin/diet therapy rather than mega-doses of statins**
- ▶ Negative side effects **increase as dosages increase**

Portfolio Eating Plan

- ▶ What if there was a combination of foods that was just as effective at lowering LDL cholesterol as the prescription drug statins?
- ▶ Would it be worth adding some new foods to your diet to avoid medication or at least lower your dose?
- ▶ Portfolio Eating Plan (PEP)



Portfolio Eating Plan

- ▶ Series of studies from the University of Toronto
- ▶ Researchers studied the effect of a truly effective dietary approach to lowering cholesterol and the risk of heart disease
- ▶ Result - *The Portfolio Eating Plan* includes foods like nuts, soy protein, oat bran, and plant sterols

NLA CLASSIFICATIONS FOR LDL-C LEVELS	
<100 mg/dL	DESIRABLE
100-129 mg/dL	ABOVE DESIRABLE
130-159 mg/dL	BORDERLINE HIGH
160-189 mg/dL	HIGH
≥190 mg/dL	VERY HIGH

Portfolio Eating Plan

- ▶ Many studies have shown benefit from certain foods for lowering cholesterol
- ▶ **Soy protein**
- ▶ **Beta-glucan fibers** (oatmeal/barley) and psyllium
- ▶ **Nuts**
- ▶ **Plant sterols/stanols**
- ▶ The FDA has approved "health claims" for each of these foods for lowering risk of heart disease



Current FDA Health Claims for CHD Risk Reduction

Vegetable Proteins

- Soy

Viscous Fibers

- Oat β -glucan
- Barley β -glucan
- Psyllium

Nuts (almonds)

Phytosterols

- Sterols
- Stanols



Portfolio Eating Plan

- ▶ The University of Toronto team asked themselves, "What would happen if we combined these components together in a diet low in saturated fat and cholesterol?"
- ▶ Their hypothesis, based on the body of literature, was that there would be a synergistic and additive effect on cholesterol levels

Portfolio Eating Plan

- ▶ Over a decade of research on the Portfolio Eating Plan
- ▶ One study directly compared 3 groups of patients with high cholesterol for one month:
 - ▶ 1. one group ate the NCEP Step II diet (<30% calories from fat; <7% from saturated fat, <200 mg cholesterol per day)
 - ▶ 2. Step II diet with 20 mg of Lovastatin
 - ▶ 3. Portfolio Eating Plan

Portfolio Eating Plan

- ▶ Statin and Portfolio Eating Plan groups drop in LDL was comparable
- ▶ 31% drop in statin group
- ▶ 29% for the PEP group
- ▶ Step II diet group had only an 8% drop



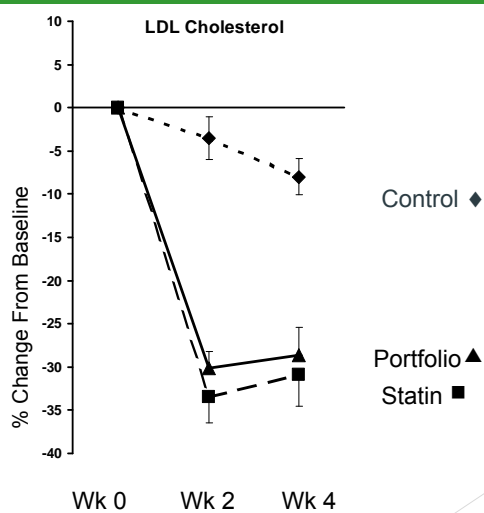
National Cholesterol Education Step 1 and 2 Diet

Recommended Intake as Percent of Total Calories		
Nutrient*	Step I Diet	Step II Diet
Total Fat	30% or less	30% or less
Saturated	7 - 10%	less than 7%
Polyunsaturated	Up to 10%	Up to 10%
Monounsaturated	Up to 15%	Up to 15%
Carbohydrate	55% or more	55% or more
Protein	Approximately 15%	Approximately 15%
Cholesterol	Less than 300 mg per day	Less than 200 mg per day
Total Calories		
* Calories from alcohol not included.		
	To achieve and maintain desired weight	To achieve and maintain desired weight

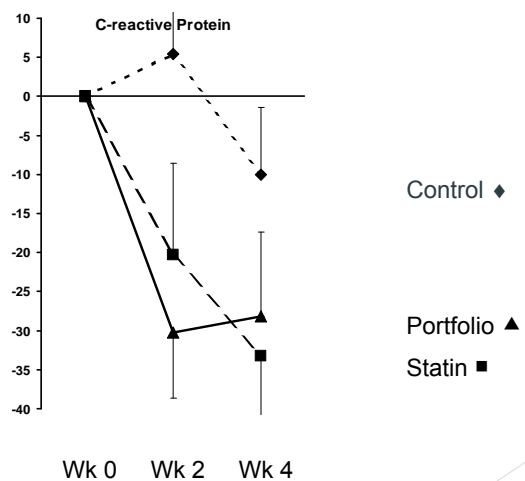
What happens if you combine these cholesterol-lowering components (Portfolio Diet)?

% LDL reduction	
NCEP step 2:	10 %
Portfolio Diet: viscous fiber	5 %
vegetable protein	5 %
plant sterols	5 %
almonds	5 %
TOTAL	30 % LDL reduction

Dietary Portfolio Changes in LDL-C



Dietary Portfolio Changes in C-Reactive Protein



Portfolio Eating Plan



- ▶ Each day consume:
- ▶ 30 grams (about 1 oz) of almonds (23)
- ▶ 20 grams of viscous/soluble fiber from foods such as oats, beans, barley and certain fruits and vegetables like Brussel sprouts and oranges
- ▶ 50-80 grams of soy protein from foods such as tofu, soy meat alternatives, soy milk, soy nuts
- ▶ 2 grams plant sterols

What Are Plant Sterols

- ▶ Plant sterols and stanols are naturally occurring substances found in plants.
- ▶ They are present in small quantities in many fruits, vegetables, vegetable oils, nuts, seeds, cereals and legumes.
- ▶ Research has shown that plant sterols/stanols included with a heart healthy eating plan may reduce your risk for heart disease.

Plant Sterols

- ▶ The sterols/stanols work by blocking the absorption of cholesterol in the small intestine.
- ▶ This lowers the low density cholesterol known as the 'bad' cholesterol (LDL) by 6-15%, without lowering the good cholesterol known as the high density cholesterol (HDL)
- ▶ Clinical research trials have documented safety and effectiveness for use by the entire family.
- ▶ Plant stanols/sterols do not interfere with cholesterol lowering medications.

- ▶ The National Cholesterol Education/Adult Treatment III program guidelines recommend plant sterols/plant stanols as part of a heart healthy eating plan.
- ▶ The Food & Drug Administration approved the health claim regarding the role of plant sterol esters in reducing risk of heart disease.
- ▶ Effectiveness has been shown with dosages of 2 to 3 grams plant stanols per day.
- ▶ The food industry has produced plant sterol/stanol enriched margarines like Benecol to meet this higher intake needed for beneficial effects.

- ▶ Because they work in different ways, plant sterols can be used effectively alongside statins or fibrates and produce an additive benefit.
- ▶ Plant sterols work through a different mechanism than statins.
- ▶ Whereas statins lower LDL by slowing cholesterol production and increasing cholesterol removal in the liver, plant sterols actually prevent the absorption of cholesterol through the stomach.
- ▶ So by combining the use of a statin with daily plant-sterol supplementation (either through food or tablet), you can achieve a greater total reduction in LDL.

Plant Sterols in food products

- ▶ Benecol spreads
- ▶ Corazona's Oatmeal Squares
- ▶ Orowheat Whole Grain and Oat bread
- ▶ www.corowise.com/wheretobuy



Plant Sterol Supplements

- ▶ Supplements taken with meals
- ▶ Nature Made Cholest-off - Walgreens, Walmart
- ▶ Twin Labs Cholesterol Success (www.vitacost.com)
- ▶ ModuChol (www.vitacost.com)
- ▶ Can also be taken with statin drugs for a synergistic effect
- ▶ Must take correct dose: 2,000 - 3,000 mg

Portfolio Eating Plan

- ▶ Participants were instructed to meet the daily fruit and vegetable recommendation of 5-9 servings per day
- ▶ What's a serving:
 - ▶ ½ cup of fruit
 - ▶ 1 medium piece of fruit
 - ▶ ¼ cup of dried fruit
 - ▶ ½ cup (4 ounces) of 100% fruit or vegetable juice
 - ▶ 1 cup of leafy vegetables
 - ▶ ½ cup of cooked or raw vegetables



Portfolio Eating Plan

- ▶ Initially the PEP research included a vegetarian diet
- ▶ In more recent studies lean meat and fish are included.
- ▶ Allows limited servings of fat-free or low-fat dairy foods, egg whites and low-saturated-fat meat like fish, white skinless poultry, and lean or extra lean red meat
- ▶ Most recent studies show that subjects who followed the plan most closely achieved and sustained a reduction in LDL cholesterol of more than 20%

Fiber

- ▶ Absorbs fat and cholesterol in the intestines
- ▶ Soluble fibers reduce total cholesterol, LDL cholesterol and triglycerides
- ▶ Each 10 grams of fiber per day reduced coronary heart disease events by 14% and coronary heart disease deaths by 27%

Fiber



- ▶ 30-50 grams TOTAL fiber per day (soluble and insoluble).
Based on calorie intake
- ▶ Soluble fiber lowers cholesterol - oats, barley, lentils, fruits, vegetables, beans
- ▶ At least 10-12 grams of soluble fiber
- ▶ Also helps with weight loss and helps stabilize blood sugar

Fiber

- ▶ Large epidemiological studies have demonstrated reduced risk for MIs and death from heart disease in people who consume higher amounts of dietary fiber
- ▶ Research of 7 major studies published in the journal Nutrition, Metabolism & Cardiovascular Disease in May, 2007: 285,000 men and women followed for 6-15 years
- ▶ People eating 3 servings per day of whole grains were 25% less likely to develop cardiovascular disease, stroke or die of CV causes

Fiber

- ▶ Psyllium (Metamucil), Konsyl can be used as supplements
- ▶ 10-12 grams per day of soluble fiber can reduce total cholesterol by up to 14% and LDL by up to 10%



Soy



- ▶ FDA approved health claim for soy
- ▶ 25-50 grams per day may reduce risk of heart disease (lowers LDL cholesterol)
- ▶ 10 grams soy protein in 1-2 cups of soymilk, or 4 oz of tofu or 1 soy burger
- ▶ Look for soy protein cereal, soy yogurt, soybeans, soy protein smoothies, soy meat replacements in Boca and Morningstar Farms

Nuts



- ▶ 2006 review of 4 large epidemiological studies:
 - Nurses' Health Study
 - Adventist Health Study
 - Iowa Women's Health Study
 - Physicians' Health Study
- 37% reduced risk of coronary heart disease in those consuming nuts at least 4 x/week

Cholesterol Lowering Foods as Good as First Line Lovastatin

- ▶ Research of hyperlipidemic adults randomly assigned to a
 - ▶ (1) low fat diet
 - ▶ (2) low fat diet and 20 mg statin
 - ▶ (3) low fat diet & fiber, nuts, plant sterols and soy
- ▶ LDL lowering 8% in the low fat diet, 30.9% in drug and diet, and 28.6% in the diet with cholesterol lowering foods.
- ▶ CR protein (inflammatory marker) dropped 28.2% in the food group.

To Reduce LDL Cholesterol

<u>► Strategy</u>	<u>Approx. LDL Lowering</u>
Moderate weight loss	5%
Add fiber/almonds/soy	5-6%
2 grams phytosterols	10%
Restrict saturated fat/trans fat/cholesterol	10%
Statin drugs	20-50%

Portfolio Eating Plan



- Guidelines:
- Substitute soy foods for meat/animal protein as often as possible
- Drink soy milk instead of milk



Portfolio Eating Plan

- ▶ The portfolio plan depends on using a variety of soy products every day to meet the recommended amounts of soy protein
- ▶ Meant to REPLACE animal-based foods
- ▶ 1 soy protein patty (Boca burger) = approx 10 grams of soy protein
- ▶ 1 cup soymilk = 6-8 grams soy protein
- ▶ Tofu = about 6 grams of soy protein per 3 oz serving

Portfolio Eating Plan

- ▶ Eat as much “sticky” fiber as possible
- ▶ People in the study took 3 daily servings of natural psyllium supplements
- ▶ Oats and barley replace other grains and preferred vegetables include eggplant and okra - high in soluble fiber
- ▶ Soy beans, beans/legumes, chickpeas, lentils



Portfolio Eating Plan

- ▶ A handful of nuts every day
- ▶ In the study, almonds were eaten and the Almond Board of California offers portfolio diet recipes on its website:
- ▶ www.almondboard.com



Portfolio Eating Plan



- ▶ Typical Day:
- ▶ Breakfast: Oat bran cereal, with soy milk and chopped fruit and almonds, with plant sterol-enriched margarine (Benecol)
- ▶ Snack: 1 cup blackberries
- ▶ Lunch: Black bean and barley burrito, apple
- ▶ Snack: Oat bran bread with 1 Tbsp Benecol and ¼ cup dried plums
- ▶ Dinner: Stir fry with tofu and vegetables, served over barley, fruit and almonds for dessert

Portfolio Eating Plan

- ▶ Concerns with soy products - a lot of Americans have never eaten them and don't even know where to find them in the store or how to cook with them
- ▶ They are in your favorite grocery store!



Portfolio Eating Plan

- ▶ Here is a list of foods to consider:
- ▶ Soy milk: multiple brands and different levels of fat/sugar. Regular or flavoring.
- ▶ Try unsweetened
- ▶ Use it in your cereal, make smoothies, cook with it



Portfolio Eating Plan

- ▶ Edamame
- ▶ Frozen whole soybeans that are harvested still green
- ▶ Usually in the freezer section
- ▶ Add to soups, stews, or eat by themselves



Portfolio Eating Plan

- ▶ Tofu - also known as bean curd
- ▶ Soft, cheese-like food made by curdling soymilk
- ▶ Curds are then pressed into a solid block
- ▶ Different levels of firmness: silken, soft and firm
- ▶ Silken works well with pureed or blended dishes (dips, etc) soft is good in soups and firm holds up well in stir fry dishes - even on the grill
- ▶ Recipes: www.soyfoods.com

Tofu Dip



- ▶ 2 scallions, coarsely chopped
- ▶ 1 [clove garlic](#), peeled
- ▶ 10 ounce package frozen chopped spinach, thawed and squeezed dry
- ▶ 1/2 teaspoon cayenne
- ▶ 1/4 pound silken tofu
- ▶ 2 tablespoons [lemon juice](#)
- ▶ Splash [sesame oil](#) (optional)
- ▶ 1 tablespoon soy sauce
- ▶ Combine all ingredients in blender and process until smooth. Transfer to bowl and serve with raw vegetables.

Portfolio Eating Plan

- ▶ Miso is a rich, salty paste condiment
- ▶ Characterizes the essence of Japanese cooking
- ▶ Traditionally made by combining with a grain, salt and a mold culture then aged in cedar vats for 1 - 3 years
- ▶ Popular Soup



Portfolio Eating Plan

- Soy nuts are whole soybeans that have been soaked then baked
- Found in snack isles



Soy nuts vs Peanuts

Soy Nuts - 1 oz

- Calories: 130
- Total Fat: 4 g
- Sat. Fat: .5 g
- Fiber: 8 g
- Protein: 14 g

Peanuts - 1oz

- Calories: 166
- Total Fat: 14 g
- Sat. Fat: 2 g
- Fiber: 2
- Protein: 6

Portfolio Eating Plan

- ▶ Try the Portfolio Eating Plan
- ▶ What have you got to lose?



Other Foods that help reverse heart disease

- ▶ Extra virgin olive oil
- ▶ Greens and other vegetables
- ▶ Figs and other fruits, especially berries
- ▶ Lentils and other legumes
- ▶ Salmon and other seafood
- ▶ Walnuts and Flaxseed
- ▶ Garlic
- ▶ Avocado
- ▶ Pinot Noir and other red wine
- ▶ Dark Chocolate



Extra Virgin Olive Oil



- ▶ Centerpiece of the **Mediterranean diet**
- ▶ **Monounsaturated** fat
- ▶ Extremely **cardioprotective** - cuts bad LDL cholesterol levels
- ▶ Helps **stabilize plaque** by preventing LDL from becoming **oxidized** - key step in perpetuating atherosclerosis
- ▶ Can **raise HDL levels**

Extra Virgin Olive Oil

- ▶ Make sure to choose "**extra virgin**" from the **first pressing of the olives**
- ▶ High percentage of **polyphenols** - most abundant antioxidants in the diet
- ▶ Help **reduce inflammation** in the artery walls
- ▶ Remember the smoke point is **325 degrees**



Greens and Other Vegetables

- ▶ Fresh, **colorful vegetables**: dark green and leafy; red, ripe, and juicy, or bright orange and crunchy
- ▶ Rainbow colored cornucopia is truly the class of foods that keeps our arteries healthy and clean
- ▶ Greeks consume an average of **9 servings of antioxidant-rich fruits and vegetables per day**
- ▶ Takes the average American *3 days* to eat that much!



Greens and Other Vegetables

- ▶ Loaded with **phytochemicals**
- ▶ Plants produce phytochemicals & polyphenols to **protect themselves** from:
 - ▶ UV light damage
 - ▶ Invasion by bacteria, fungi and viruses
 - ▶ How plants respond to stress damage and heal themselves
 - ▶ Heal humans too!



Greens and Other Vegetables

- By eating these plants - *it does the same thing for us:* protects us from diseases like heart disease, diabetes, cancer



Greens and Other Vegetables

- To determine which components of the Mediterranean diet (best for extending life) have the greatest effect on longevity, scientists analyzed data from more than 23,000 men and women
- Researchers found that longevity was most associated with the following, in descending order of significance:

Greens and Other Vegetables

- ▶ 1. Moderate consumption of alcohol (red wine drunk with meals)
- ▶ 2. Low consumption of meat
- ▶ 3. High consumption of vegetables
- ▶ 4. High consumption of fruit and nuts
- ▶ 5. High consumption of olive oil
- ▶ 6. High consumption of legumes



Don't forget the Purple

- ▶ Red/purple vegetables such as red cabbage, red beets, blackberries, radicchio and eggplant
- ▶ Contain anthocyanins
provide **cardioprotection**
by increasing the heart's
production of glutathione,
the primary antioxidant in heart cells



Tips for getting in veggies

- ▶ Eat a dark green salad at lunch and/or dinner when eating in or out
- ▶ Bring cut up veggies to work or on errands
- ▶ Buy prewashed, bagged, and pre-chopped vegetables, toss them on a sheet of tinfoil, drizzle with oil and roast at 425 degrees for at least 30 minutes
- ▶ Buy frozen vegetables - and don't feel guilty

Figs and other fruit

- ▶ Staple of Mediterranean diet
- ▶ Loaded with carotenoids, most notably lycopene, lutein and beta-carotene
- ▶ Scientifically proven to exhibit the highest antioxidant capacity of most commonly eaten dried fruits



Figs and other fruit

- ▶ One of the most common components of the Mediterranean diet pattern is “fresh fruit for dessert”
- ▶ Studies show that people with a higher intake of vitamin C *from foods* exhibit much less progression of atherosclerotic plaque compared to other groups
- ▶ People with lowest blood levels of vitamin C had 2.5 times the risk of having a heart attack

Tips for getting in fruit

- ▶ Make fresh fruit a standard for breakfast fare
- ▶ Try fruit for dessert - try dried figs!
- ▶ Substitute fruit for fat in baking: mashed bananas, prune puree, baby food!
- ▶ Add figs or other dried fruits to dark green leafy salads
- ▶ Try fruit for snacks



Lentils and other legumes

- ▶ Try for ½ cup most days of the week
- ▶ Loaded with plant protein, polyphenols, and fiber
- ▶ Research in the journal *Archives of Internal Medicine*: 9,632 people were followed for 19 years - those consuming legumes **4 times or more per week had a 22% lower risk of cardiac event**

Lentils and other legumes

- ▶ Lentils, pinto beans, red beans, black-eyed peas, peanuts, garbanzo beans, etc
- ▶ **"Plant protein"** Mother Nature's healthy version of meat
- ▶ You get a nice dose of plant protein but without any artery-clogging excess baggage that goes along with it



Lentils & Rice vs Porterhouse Steak

1 cup lentils & 1/2 cup
brown rice

21 grams protein

2 grams fat

0 grams saturated fat

0 mg cholesterol

340 calories

18 grams fiber



9-oz porterhouse steak

57 grams protein

69 grams fat

27 grams saturated fat

195 mg cholesterol

870 calories

0 grams fiber



Salmon and other seafood

- ▶ Consume oily fish **at least 3 x per** week and take **fish oil pills**
- ▶ Omega 3 fats **slow down the disease process and can even promote reversal of atherosclerosis**
- ▶ Protect against electrical disturbances of the heart - arrhythmias
- ▶ Thin the blood, making platelets less likely to stick together and form clots

Salmon and other seafood

- ▶ Best sources - salmon, mackerel, lake trout, herring, sardines, tuna
- ▶ 3.5 oz of oily fish contains about 1,000 mg EPA & DHA



Don't Fry Your Fish

- ▶ Harvard University researchers studied almost 5,000 people over age 65 who ate fried fish and fish sandwiches more than once a week
- ▶ 44% *greater risk* of having an ischemic stroke
- ▶ 30% *reduced risk* in those who ate baked or broiled fish 5 or more times per week



Walnuts and Flaxseeds

- ▶ Alpha-linolenic acid or ALA - the "other" omega-3 star
- ▶ Omega 3 fatty acids from plants
- ▶ Studies show that people who eat an ALA-rich diet are **less likely to suffer a fatal heart attack**



Walnuts and Flaxseeds



- ▶ Walnuts and Flaxseeds are 2 ancient plant foods that have sustained humans since the dawn of civilization
- ▶ Both are **top sources of ALA**
- ▶ Packed with the **most plaque-fighting antioxidants relative to all other nuts**
- ▶ Flax contain one of the greatest amount of vegetable omega-3 fats of any edible plant along with lots of soluble fiber

Tips for getting in Walnuts and Flax

- ▶ Have a small handful of nuts for a snack
- ▶ Enjoy a fat-free Greek yogurt topped with a little honey or fruit, some crushed walnuts and ground flaxseeds for dessert
- ▶ Sprinkle walnuts on your salad
- ▶ Add flaxseed to your oatmeal
- ▶ Add flaxseed to your pancake mix



Oatmeal and Other Whole Grains

- ▶ Complete whole grains such as oatmeal, barley, brown rice, quinoa, corn, popcorn and bulgur wheat are best
- ▶ Second best is 100% whole grain breads or cereals, pasta, etc



Oatmeal and Other Whole Grains

- ▶ Choosing whole grains as your main form of carbohydrates has been scientifically proven to thwart heart disease, **cutting risk of coronary artery disease by up to 40%!!**
- ▶ Whole-grain intake can halt the progression of atherosclerosis in people already diagnosed with coronary heart disease

Oatmeal and Other Whole Grains

- ▶ Oats have a type of **soluble fiber called beta-glucan** which is highly effective at LDL lowering
- ▶ Research shows that **for every 10 gram increase in daily intake of fiber from grains, you reduce your risk of a coronary event by 10% and the risk of heart disease by 25%**
- ▶ 25 to 40 grams per day depending on calorie intake

Oatmeal and Other Whole Grains

- ▶ Try for at least **3 whole grain servings per day from:**
- ▶ Amaranth, barley, buckwheat, corn, millet, oats, quinoa, rice, rye, teff, wheat



Tips for getting in whole grains

- ▶ Make oatmeal for breakfast - add unsweetened soymilk, nuts and fruit. Mix in some whey or soy protein
- ▶ Cook up a large batch of steel-cut oatmeal - higher in beta glucan. Keep in refrigerator and portion it out each day
- ▶ Have quinoa, brown rice or barley at dinner
- ▶ Make a cold bean/barley salad

Tips for getting in whole grains

- ▶ Snack on popcorn from a hot-air popper, spray with Pam and sprinkle with spices: 3 cups = 1 serving
- ▶ Have a slice of veggie pizza made from whole wheat crust
- ▶ Buy 100% whole grain bread, crackers, pita, bagels, etc



Wine

- ▶ Part of the human culture for millennia
- ▶ Secret of the "French Paradox" is thought by scientists to be resveratrol
- ▶ Reduces heart attack risk



Wine



- ▶ Scientific data shows that drinking alcohol regularly, lightly to moderately, with meals, guards against heart disease and lengthens life
- ▶ Consuming high doses harms the heart and causes disease
- ▶ Reduces risk of death from a heart attack by 30-50%
- ▶ All types of alcohol are associated with lower risk, red wine offers greatest cardioprotection

Wine

- ▶ Key is moderation
- ▶ One 5-oz glass per day for women
- ▶ No more than two 5-oz glasses per day for men
- ▶ Go home and measure your wine glass!



Wine



- ▶ Best at raising HDL cholesterol
- ▶ 1-2 drinks per day **increases HDL by an average of 12%**
- ▶ Acts as an **anti-inflammatory**
- ▶ Loaded with polyphenols antioxidants
- ▶ Cabernet Sauvignon, Pinot noir best

Green Tea

- ▶ Catechins, especially EGCG in green tea, improve lipid profiles
- ▶ EGCG reduces LDL cholesterol and oxidation of LDL
- ▶ Research shows that green tea lowers total cholesterol and raises HDL ("good") cholesterol in both animals and people.
- ▶ One population-based clinical study found that men who drink green tea are more likely to have lower total cholesterol than those who do not drink green tea.
- ▶ Results from one animal study suggest that polyphenols in green tea may block cholesterol from being absorbed in the intestine and also help the body get rid of cholesterol.
- ▶ In another small study of male smokers, researchers found that green tea significantly reduced blood levels of harmful LDL cholesterol.

Dark Chocolate

- ▶ The food of the Gods
- ▶ Science is stacking up linking daily consumption of deep, dark chocolate with phenomenal health benefits, especially on your heart and blood vessels



Dark Chocolate



- ▶ It's the flavonoids
- ▶ Recent study out of Stockholm, found that people who eat chocolate high in cocoa solids have increased long-term survival rates following heart attack
- ▶ 1,200 middle-aged men and women who had history of heart attack
- ▶ Compared with people who ate no chocolate, those who indulged up to once per week had a 44% reduced risk of dying from subsequent heart attack, and those who ate it twice or more per week had a 66% reduced risk

Dark Chocolate

- ▶ Level of nonfat cocoa solids is the main factor in determining antioxidant activity
- ▶ More nonfat cocoa solids, the better
- ▶ **Natural cocoa powders are highest**, followed by unsweetened baking chocolates, dark chocolates, and semisweet chocolate baking chips
- ▶ Milk chocolate had least



Dark Chocolate

- ▶ Best to consume chocolate concoctions made from **unsweetened natural cocoa baking powder**
- ▶ Not Dutch processing with alkali
- ▶ Look for words "**natural cocoa powder unsweetened**" on label
- ▶ Scharffen Berger or Ghiradelli brand natural cocoa powder

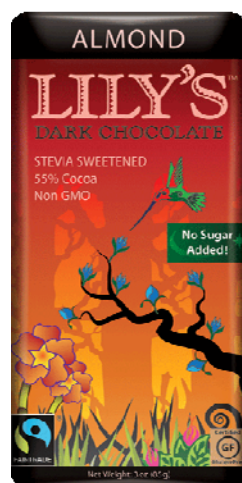


Dark Chocolate

- ▶ If you eat a bar - eat part of the bar
- ▶ Look at ingredient list; make sure first ingredient is cocoa or chocolate and not sugar
- ▶ Look at serving size! No more than 20 grams - about 2 small squares
- ▶ It still has lots of fat and sugar!



Dark Chocolate



If a little bit is good . . .

► DOESN'T MEAN A LOT IS BETTER!!!

- Wine
- Chocolate
- Nuts



Garlic

- In Meta-analysis: 39 trials in dyslipidemia
- Total cholesterol was reduced by 17 mg/dL
- LDL reduced by 9 mg/dL and oxidized LDL was decreased as well
- HDL increased by 1.5 mg/dL
- Garlic reduces coronary calcium and plaque progression in humans on statins in research trials on 23 patients
- Dosage: Aged garlic 600 mg twice a day. Health food stores and Amazon



Avocados

- ▶ In a small randomized crossover trial, scientists at Penn State fed 45 overweight or obese participants three cholesterol-lowering diets for five weeks each: a low-fat (24% fat) diet, a moderate fat (34% fat) diet with one fresh avocado a day, and a moderate fat (34% fat) diet with a fatty acid content similar to the avocado diet.
- ▶ Despite the near-similarity of the two moderate-fat diets, the avocado diet reduced LDL ("bad") cholesterol best, especially the most dangerous small dense LDL cholesterol, and also improved the ratio of LDL/HDL the most.
- ▶ *Journal of the American Heart Association*. 2015 Jan 7;4(1). Wang et al.

Cut the Sugar!!

- ▶ Reduce the amount of sugar and flour in your diet.
- ▶ Recent evidence indicates that added sugar - in the form of table sugar (sucrose) or high-fructose corn syrup - is probably a greater contributor to heart disease than is consumption of saturated fat.
- ▶ Sugar increases inflammation!

Avoid Trans Fats

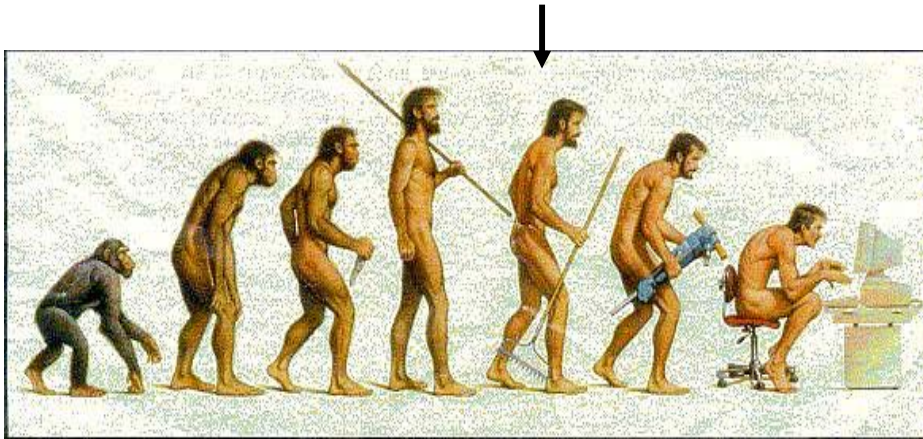
- ▶ These heart-damaging fats can reduce HDL ("good") cholesterol levels and raise levels of LDL ("bad") cholesterol.
- ▶ Look for the words "partially hydrogenated oil" on a food's ingredient list.
- ▶ Trans-fats are found in many brands of margarine and in most heavily processed foods, as well as in snack foods such as chips, crackers and cookies, and in the oils used to cook fast-food French fries, doughnuts and movie popcorn.
- ▶ Trans fat free does not necessarily mean trans fat free!

Don't Forget Exercise

- 60 minutes per day moderate to vigorous
- = 3.7 years added life
- 3.2 years disease free



- **NO DRUG HAS THIS ADVANTAGE**



Somewhere, something went terribly wrong

Supplements to Reduce Cholesterol: Niacin (Vitamin B 3)

- ▶ Niacin can raise HDL cholesterol by more than 30%. HDL, the "good" cholesterol, picks up excess bad cholesterol in your blood and takes it back to your liver for disposal.
- ▶ For men, HDL levels under 40 mg/dL increase the risk of heart disease.
- ▶ For women, HDL levels under 50 mg/dL increase the risk of heart disease.
- ▶ Studies show average changes in lipids in the dose range of 1-4 grams/day:
- ▶ Total cholesterol 20-25% decrease with niacin supplementation
- ▶ LDL 25% decrease
- ▶ Triglycerides 20-25% decrease
- ▶ HDL 15-35% increase

Niacin

- ▶ This B vitamin, taken in very large doses (1 to 3 grams a day), is actually a drug and is sold by prescription as well as over the counter (OTC).
- ▶ It lowers LDL ("bad") cholesterol by up to 30 percent, but unlike statins, it also substantially boosts HDL ("good") cholesterol and reduces triglycerides.
- ▶ A common side effect is flushing; in rare cases, it can cause liver damage.
- ▶ **Should always consult your MD if you plan to take niacin in large doses**

Niacin

- ▶ Adverse effects: high blood sugar, gout, hepatitis, flushing, rash, gastritis, bruising and palpitations
- ▶ **Work with your doctor** to include niacin in your treatment
- ▶ Inositol hexanicotinate which is often referred to as non-flush niacin, is **not effective** in dyslipidemia compared to placebo and is not recommended



Pantethine

- ▶ Pantethine is a dietary supplement that is related to vitamin B5 (pantothenic acid).
- ▶ In clinical human trials with 646 patients it lowered total cholesterol by 15% (up to 20.5% at 9 months)
- ▶ Lowered LDL cholesterol by 20%. Reduces LDL oxidation as well
- ▶ Increased HDL by 8%
- ▶ Lowered triglycerides by 33% (up to 36.5% at 9 months)
- ▶ Research studies found it reduced fatty streaks in coronary arteries
- ▶ Can take with statins
- ▶ Dose is 450 mg twice a day

Red Yeast Rice

- ▶ Of all the natural supplements available to help lower cholesterol, red rice yeast extracts are by far the most effective.
- ▶ Red rice yeast (*Monascus purpureus*) is a source of naturally occurring statins, the same class of prescription drugs used to lower and control cholesterol
- ▶ Because red rice yeast extract delivers a mix of those compounds rather than a single type of molecule, it is much less likely to cause the side effects that sometimes occur with the pharmaceutical versions.

Red Yeast Rice

- ▶ Red yeast rice is rice that has been fermented by the red yeast, *Monascus purpureus*.
- ▶ It has been used by the Chinese for many centuries as a food preservative, food colorant (it is responsible for the red color of Peking duck), spice, and an ingredient in rice wine.
- ▶ Red yeast rice continues to be a dietary staple in China, Japan, and Asian communities in the United States, with an estimated average consumption of 14 to 55 grams of red yeast rice per day per person.

Red Yeast Rice

- ▶ Red yeast rice also has been used in China for over 1,000 years for medicinal purposes.
- ▶ Red yeast rice was described in an ancient Chinese list of drugs as useful for improving blood circulation and for alleviating indigestion and diarrhea
- ▶ It contains eight mevinic acids (statins), mainly lovastatin or monacolin K.
- ▶ It also contains sterols and other components.
- ▶ Its overall cholesterol-lowering effect may be due to a combination of several of its constituents.

Red Yeast Rice

- ▶ The evidence: Compared to that of most dietary supplements, the evidence of red yeast rice's efficacy is quite strong -- which isn't entirely surprising, given that red yeast rice is, in effect, a low-dose statin.
- ▶ In studies over the years (including in several high-quality trials), various red yeast rice preparations have been shown to lower LDL by around 20 to 30%, comparable to a prescription statin.
- ▶ In the most recent trial, a 2009 study of patients who had stopped taking statins due to muscle pain, red yeast rice capsules lowered total cholesterol and LDL by 15% and 21%, respectively (compared to 5% and 9% for placebo).

Red Yeast Rice

- ▶ Since it contains lovastatin, it can be expected to have the same side effects as the prescription drug.
- ▶ Patients on statins are monitored for liver, muscle, and kidney damage; sellers of red yeast rice do not usually inform their customers of those risks.
- ▶ There are also a number of interactions with other drugs and dietary supplements. And eating grapefruit can affect blood levels of lovastatin.
- ▶ RYR inhibits the body's natural synthesis of coenzyme Q10 (CoQ10), which is needed for optimum heart health and general health, so whether you take red rice yeast extract or statins, be sure to take 90 - 120 mg of CoQ10 every day.

Red Yeast Rice

- ▶ Study in American Journal of Cardiology 2008 Jun 15, of 5,000 people who had suffered a heart attack
- ▶ Those who took an extract of red yeast rice for five years reduced their risk of repeat heart attacks by 45%.
- ▶ It also lowered their chances of having a heart procedure such as bypass surgery or angioplasty, and even appeared to reduce their risk of cancer by as much as two-thirds.

Red Yeast Rice

- ▶ A study presented to the American Heart Association showed that red yeast rice lowered LDL cholesterol.
- ▶ In the study, 187 people had mild-to-moderately high levels of total cholesterol and LDL cholesterol.
- ▶ The study showed that taking red yeast rice reduced total cholesterol by more than 16%, LDL cholesterol by 21%, and triglycerides by 24%. HDL cholesterol also went up by 14%.

Red Yeast Rice

- ▶ In another 8-week study of 446 people with high cholesterol, those who took red yeast rice had a drop in cholesterol levels compared to those who took placebo.
- ▶ Total cholesterol fell by 22.7%, LDL by 31%, and triglycerides by 34% in the red yeast rice group. HDL cholesterol went up by 20% in the red yeast rice group as well.
- ▶ Most studies have used standardized extract: 600 mg, 2 - 4 times daily.

Red Yeast Rice

- ▶ Researchers don't know whether it is safe to use red yeast rice for longer than 12 weeks.
- ▶ People with liver disease and those at risk for liver disease should not take red yeast rice. Red yeast rice may affect the function in the same way prescription drugs to lower cholesterol can.
- ▶ These people should not take red yeast rice: people with kidney disease, thyroid problems, or musculoskeletal disorders, or those at higher risk of cancer.
- ▶ People who drink more than two alcoholic beverages a day, have a serious infection or physical condition, or have had an organ transplant should also avoid using red yeast rice.

Red Yeast Rice

- ▶ The bottom line: Red yeast rice is a potentially effective way to lower cholesterol, but its potency makes some experts wary.
- ▶ The amount of lovastatin in red yeast rice pills varies widely across brands -- so much so that some brands appear to be spiked with lovastatin, according to an **analysis performed by a consumer watchdog group called consumerlab.**
- ▶ Use a reputable brand.
- ▶ Recommend: Xymogen Red Yeast Rice: 900 mg 3 times a day
- ▶ Call (800) 647-6100 and tell them Susan Buckley RD recommended this product for you

Berberine

- ▶ Berberine is a chemical found in several plants including European barberry, goldenseal, goldthread, Oregon grape, and tree tumeric.
- ▶ There is early evidence that berberine can help lower cholesterol levels in people with high cholesterol.
- ▶ Taking 500 mg of Berberine HCL 1-2 times daily for 3 months seems to reduce total cholesterol, low-density lipoprotein (LDL or "bad") cholesterol, and triglyceride levels in people with high cholesterol. Can use with statins.

Berberine

- ▶ Meta-analysis of 11 trials of Berberine in 874 subjects, showed significant reductions in total cholesterol (22.5 mg/dL), LDL (25 mg/dL), Triglycerides (44 mg/dL) and increase in HDL similar to above studies
- ▶ Berberine reduces cholesterol absorption and increases biliary excretion of LDL

- ▶ A two-part study published in *Metabolism* in 2008 that people taking 1,500 mg of Berberine daily achieved significant improvement in both fasting and postprandial blood glucose levels, along with hemoglobin 3-month average healthy blood sugar levels.
- ▶ A second double-blind, placebo-controlled study not only backed up the results from the previous study, but showed even more benefits with Berberine, including a full 25% decline in both total cholesterol and LDL cholesterol, as well as lower triglyceride levels.
- ▶ In another randomized, placebo-controlled trial, berberine lowered triglycerides by 35.9%, LDL cholesterol by 21%, and total cholesterol by 18%, compared to minimal declines in cholesterol and an increase in triglycerides in the control group.

Berberine

- ▶ **Diabetes:** Berberine can lower blood sugar. Theoretically, berberine may cause blood sugar to become too low if taken by diabetics who are controlling their blood sugar with insulin or medications. Use with caution in people with diabetes.
- ▶ **Low blood pressure:** Berberine might lower blood pressure. Use with caution in people with low blood pressure.

Probiotics

- ▶ Probiotics are live microorganisms (naturally occurring bacteria in the gut) thought to have beneficial effects; common sources are yogurt or dietary supplements.
- ▶ In studies at McGill University in Montreal a formulation of the bacteria, known as *Lactobacillus reuteri* NCIMB 30242, lowered blood levels of LDL or "bad" cholesterol.
- ▶ Those taking the probiotic had LDL levels 11.6% lower than those on placebo after nine weeks.
- ▶ People taking the probiotic had total cholesterol reduced by 9.1%. HDL "good" cholesterol and blood triglycerides, a dangerous form of fat in the blood, were unchanged.

Probiotics

- ▶ Scientists have proposed that *Lactobacillus* bacteria alone may impact cholesterol levels in several ways, including breaking apart molecules known as bile salts. *L. reuteri* NCIMB 30242 was fermented and formulated to optimize its effect on cholesterol and bile salts.
- ▶ Based on correlations between LDL reduction and bile measurements in the gut, the study results suggest the probiotic broke up bile salts, leading to reduced cholesterol absorption in the gut and less LDL.
- ▶ The probiotic worked at doses of just 200 milligrams a day, far lower than those for soluble fiber or other natural products used to reduce cholesterol.

Probiotics

- ▶ Available at Walgreens



He that takes medicine and neglects diet,
wastes the skill of the physician

- Chinese proverb



Let's Get
Cooking!

