

# AU InforMed

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## Key Inforbits

- About lipids
- Cholesterol level goals
- Alternative treatments
- Diet featuring sample Southern diet
- Exercise and weight management
- Straight from the headlines

## September is ... **National Cholesterol Education Month**

**About Lipids:** Cholesterol is a fat-like substance (lipid) found in cell membranes and used by the body to produce bile acids and steroid hormones. Low density lipoproteins (LDL), high density lipoproteins (HDL), and very low density lipoproteins (VLDL) are the three major classes of lipoproteins that carry cholesterol throughout the blood. Elevated cholesterol levels, particularly LDL, contribute to the formation of atherosclerotic plaques and further development of coronary heart disease (CHD), like myocardial infarction (MI). This process begins early in life and is often unrecognized due to lack of symptoms.<sup>1</sup>

In addition, there are numerous non-lipid factors, both environmental and genetic, that affect cholesterol levels and are involved in the development of dyslipidemia.<sup>1,2</sup>

### Modifiable factors include

- \*Hypertension
- \*Cigarette smoking
- \*Thrombogenic/hemostatic state
- \*Diabetes
- \*Obesity
- \*Physical inactivity
- \*Atherogenic diet

### Nonmodifiable risk factors

- \*Age
- \*Gender (male sex)
- \*Genetics

### Consequences of high cholesterol

- Hypercholesterolemia, high LDL, and low HDL levels increase the chance of cardiovascular disease and cerebrovascular morbidity and mortality.<sup>2</sup>
- It is extremely important to reduce cholesterol levels to help in the prevention and/or slow the progression of atherosclerosis and plaque stabilization.<sup>2</sup>
  - HMG-CoA reductase inhibitors (statins) are first-line agents chosen for most patients. They have been shown to reduce cholesterol levels and, therefore, decrease the risk of coronary or other atherosclerotic vascular disease.<sup>3</sup>

### Primary Prevention: Risk status based on presence of CHD risk factors other than LDL cholesterol:<sup>1</sup>

- Positive risk factors
    - Age
      - Men:  $\geq 45$  years old
      - Women:  $\geq 55$  years old or with premature menopause without estrogen replacement therapy
    - Family history of premature CHD described as definitive MI or sudden death before the age of
      - 55 in father or other 1<sup>st</sup> degree male relative **OR**
      - 65 in mother or other 1<sup>st</sup> degree female relative
    - Cigarette smoking
    - Hypertension ( $\geq 140/90$  mmHg or taking an antihypertensive medication)
    - Low HDL ( $<40$  mg/dL)
  - Negative risk factor
    - High HDL ( $\geq 60$  mg/dL)
1. Grundy SM, Becker D, Clark LT, Cooper RS, Denke MA, Howard WJ, et al. National Cholesterol Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III), Final Report. National Cholesterol Education Program. National Heart, Lung, and Blood Institute. 2002 Sept; NIH Publication No. 02-5215.

2. Talbert RL. Dyslipidemia. In: DiPiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM, editors. *Pharmacotherapy: A pathophysiologic approach*. 8th ed. New York: McGraw-Hill Medical; c2011. p. 365-88
3. Abramowicz M. Treatment Guidelines from the Medical Letter: Drugs for lipids. New Rochelle: The Medical Letter, Inc. 2011 Mar; 9(103):13-20.

## Cholesterol Level Goals

<b>LDL Cholesterol</b> <ul style="list-style-type: none"> <li>• &lt; 100 Optimal</li> <li>• 100-129 Near/above optimal</li> <li>• 130-159 Borderline high</li> <li>• 160-189 High</li> <li>• ≥190 Very high</li> </ul>	<b>Total Cholesterol</b> <ul style="list-style-type: none"> <li>• &lt; 200 Desirable</li> <li>• 200-239 Borderline high</li> <li>• ≥ 240 High</li> </ul> <b>HDL Cholesterol</b> <ul style="list-style-type: none"> <li>• &lt;40 Low</li> <li>• ≥60 High</li> </ul>
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Adapted from: Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of the third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *JAMA* 2001;285:2486-2497.

## Alternative Treatments

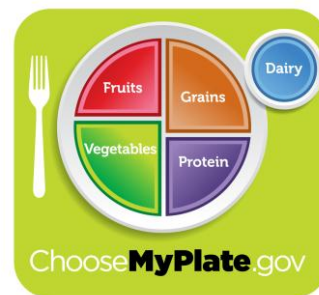
- **Beta-sitosterol (Plant Sterols):** Beta-sitosterol is a component of plant cell membranes that has a structure similar to cholesterol. An average diet provides about 175-200 mg/day, but recommended daily intake is 1.5-3 g. Beta-sitosterol decreases cholesterol absorption from the gut by about 50%, significantly reducing total and LDL cholesterol levels, but it has little or no effect on HDL or triglyceride levels. Used alone, beta-sitosterol decreases total cholesterol and LDL levels by 10-15%. When added to a statin, it decreases total cholesterol by an additional 3-11% and LDL by 7-16%. Fats are needed to solubilize plant sterols, so these products are commonly added to margarines.
- **Fish Oil (Omega-3 Fatty Acids):** “Fish oil” is a term used to describe two of the omega-3 fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Fish with the highest omega-3 content (about 1 g/100 g of fish) are fatty fish like mackerel, halibut, salmon, mullet, herring and sardines. Omega-3 acids are metabolized into eicosanoids which regulate blood pressure, clotting, and immune and inflammatory responses. Fish oil has been shown to reduce triglycerides but has little effect on HDL or total cholesterol. Modest increases in LDL cholesterol have been observed, but some experts believe this risk is less than the benefits. Fish oil at doses of 2-5.4 g/day of EPA and DHA is generally well tolerated, with most side effects being nausea, indigestion and a “fishy” aftertaste.
- **Red Yeast Rice:** Red yeast rice products contain extracts of the *Monascus purpureus* strain of red yeast grown on rice. *M. purpureus* is a natural source of mevinolin, the active ingredient in lovastatin. Red yeast rice has been shown to lower LDL cholesterol, which isn’t surprising given that it contains the active ingredient of a statin. The amount of mevinolin contained in the capsule varies between manufacturers, which is a concern because like lovastatin, red yeast rice can cause myopathy. Because of the safety concerns and the lack of studies that directly compare red yeast rice to a statin, red yeast rice cannot be recommended in place of a statin.
- **Niacin:** Niacin is available as an over-the-counter supplement or as a prescription for treating hyperlipidemia. Niacin increases HDL cholesterol by up to 35%, making it the best drug available for increasing HDL. It also lowers triglycerides by 20%-50%, and decreases LDL by 5%-25%. The effects of niacin are dose-dependent. Doses of 1,200-3,000 mg/day are typically needed to treat hyperlipidemia. While prescription niacin comes in strengths of 500mg or greater, supplemental niacin comes as 250 mg or less. A patient would need to take at least 2 times the number of supplemental products to have the same efficacy of prescription strength pills. Due to the risk of adverse effects like flushing, pruritus and hepatotoxicity, patients taking high doses of OTC niacin should be monitored by a physician.

1. Natural Medicines Comprehensive Database [AUHSOP Intranet]. Stockton, California: Therapeutic Research Faculty; c1995-2010 [updated 2011 cited 2011 Aug 22] [approx. 10 p.] Available from: <http://naturaldatabase.therapeuticresearch.com:80/nd/Search>
2. Lexi-Comp Online [AUHSOP Intranet]. Hudson, OH: Lexi-Comp Inc. [Updated 2011, cited 2011 Aug 22]. Available from <http://online.lexi.com/crlsql/servlet/crlonline>
3. DerMarderosian A, Beutler JA. *The Review of Natural Products*. 6<sup>th</sup> ed. St. Louis: Wolters Kluwer Health; c2010. 1672 p.

## Making Therapeutic Lifestyle Changes (TLC) to Decrease Risk

**Diet:** The U.S. Department of Agriculture’s (USDA) new primary food group symbol, “MyPlate”, which was issued earlier this year and based on the 2010 Dietary Guidelines for Americans (DGA), is used to emphasize the 5 basic food groups that consumers should use to create a healthy plate. Fruits and vegetables should make up half your plate, and at least half of your grains should be whole grains. Additionally, lean protein or

poultry is suggested along with switching to fat-free or low-fat dairy products.<sup>1</sup> Compared to the “MyPlate” recommendations for the general population, the “TLC diet” is more specific in order to guide patients with elevated cholesterol levels. The “TLC diet” suggests a reduction in cholesterol and saturated fat intake. Saturated fat intake should consist of less than 7% of total calories, and dietary cholesterol intake should be less than 200 mg each day. Additional recommendations include increasing consumption of soluble fiber (10-25 g/day) and plant stanols/sterols (2 grams/day) to help further reduce LDL.<sup>2,3</sup>



### Example Menu incorporating “Southern Cuisine” so many people love.<sup>1</sup>

MEN, 25-49 years old	WOMEN, 25-49 years old
<b>Breakfast</b> Bran cereal (3/4 cup) with banana (1 medium), fat-free milk (1 cup) Biscuit, made with canola oil (1 medium), jelly (1 Tbsp), soft margarine (2 tsp) Honeydew melon (1 cup) Orange juice, calcium fortified (1 cup) Coffee (1 cup) with fat-free milk (2 Tbsp)	<b>Breakfast</b> Bran cereal (3/4 cup) with banana (1 medium), fat-free milk (1 cup) Biscuit (low sodium) made with canola oil (1 medium), jelly (1 Tbsp), soft margarine (1 tsp) Honeydew melon (1/2 cup) Coffee (1 cup) with fat-free milk (2 Tbsp)
<b>Lunch</b> Chicken breast (3 oz), sautéed with canola oil (2 tsp) Collard greens (1/2 cup) in chicken broth, low sodium (1 Tbsp) Black-eyed peas (1/2 cup) Corn on the cob (1 medium) with soft margarine (1 tsp) Rice, cooked (1 cup) with soft margarine (1 tsp) Fruit cocktail, canned in water (1 cup) Iced tea, unsweetened (1 cup)	<b>Lunch</b> Chicken breast (2 oz) cooked with canola oil (2 tsp) Corn on the cob (1 medium) with soft margarine (1 tsp) Collard greens (1/2 cup) in chicken broth, low sodium (1 Tbsp) Rice, cooked (1/2 cup) Fruit cocktail, canned in water (1 cup) Iced tea, unsweetened (1 cup)
<b>Dinner</b> Catfish (3 oz) coated with flour and baked with canola oil (1/2 Tbsp) Sweet potato (1 medium) with soft margarine (2 tsp) Spinach (1/2 cup) in vegetable broth, low sodium (2 Tbsp)	Corn muffin (1 medium) with fat-free milk, egg substitute, and soft margarine (1 tsp) Watermelon (1 cup) Iced tea, unsweetened (1 cup)

1. USDA: MyPlate [Internet]. Washington, DC: United States Department of Agriculture; c 2011. [updated 2011 Aug 18; cited 2011 Aug 26]; [about 8 screens]. Available from: <http://www.choosemyplate.gov/index.html>
2. Grundy SM, Becker D, Clark LT, Cooper RS, Denke MA, Howard WJ, et al. National Cholesterol Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III), Final Report. National Cholesterol Education Program. National Heart, Lung, and Blood Institute. 2002 Sept; NIH Publication No. 02-5215.
3. NHLBI: National Cholesterol Education Month [Internet]. Bethesda: National Heart Lung and Blood Institute; c 2011. [cited 2011 Aug 25]; [about 5 screens]. Available from: <http://hp2010.nhlbi.nih.net/cholmonth/>

**Exercise and Weight Control:** Implementing an exercise and weight loss plan is both safe and effective beyond CHD risk reduction and helps to improve atherogenic dyslipidemia, which consists of high triglycerides, small LDL particles, and low HDL.<sup>1</sup> Regular exercise will not only help to reduce CHD risk but also encourage energy balance that will help maintain a healthy weight and improve the metabolic syndrome.<sup>1</sup> Losing 10 lbs will likely lead to about a 5-8% reduction in LDL.<sup>1</sup> On the other hand, HDL can be increased by 5-20% with weight loss and by 5-30% with exercise.<sup>1</sup>

#### Recommendations:<sup>1</sup>

- Try to limit sedentary activities. Patients should burn 200 calories/day through physical activities.
  - Patients should exercise about 30 minutes/day most days of the week.
  - To effectively lose weight, aim to lose about 10% of your body weight in 6 months or ½ -1 lb/week.
1. Grundy SM, Becker D, Clark LT, Cooper RS, Denke MA, Howard WJ, et al. National Cholesterol Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III), Final Report. National Cholesterol Education Program. National Heart, Lung, and Blood Institute. 2002 Sept; NIH Publication No. 02-5215.



### Straight from the Headlines

#### To Be or Not to Be ... OTC?

In light of Lipitor’s® (atorvastatin) patent expiring in November of this year, Pfizer, Inc is reportedly pursuing a venture that would make Lipitor® available over-the-counter (OTC).<sup>1,2</sup> Pfizer generates \$11

billion/year for Lipitor®, but these profits will decrease once it becomes available as a generic product. Nevertheless, Pfizer believes that converting Lipitor® to an OTC product will help with rising healthcare costs, since it would make Lipitor® available to more people at a lower cost.<sup>1</sup> Medications, like Claritin® (loratadine) and Zyrtec® (cetirizine), have successfully made the switch from prescription to OTC. However, the U.S. Food and Drug Administration (FDA) has rejected previous attempts by Merck and Bristol-Myers Squibb to make Mevacor® (lovastatin) and Pravachol® (pravastatin), respectively, OTC because research found that patients who had less than a 5% risk of a cardiovascular event in the next 10 years comprised 30% of those who believed that they needed the drug.<sup>1,2</sup> In addition, the FDA is concerned that patients taking OTC Lipitor® will not have their cholesterol levels adequately monitored.<sup>1,2</sup> Unlike the allergy medications Claritin® and Zyrtec®, Lipitor® is not taken for symptom relief, so patients may not be able to accurately decide if they need it or if it is beneficial.<sup>1,2</sup> Since patients may take Lipitor® without having the necessary indication, their risk of adverse drug reactions, specifically myopathy, may increase.<sup>1</sup> Pfizer has neither confirmed nor denied its intention to make Lipitor® OTC, but an anonymous source revealed that Pfizer is looking into this venture as well as making Lipitor® a “branded generic version.”<sup>2</sup>

1. Loftus P. Pfizer seeks to sell Lipitor over the counter [Internet]. The Wall Street Journal. 2011 Aug 3. Available from: <http://online.wsj.com/article/SB10001424053111903885604576486393490294726.html?mod=djemalertNEWS>.
2. Pollack A. Pfizer is said to pursue nonprescription Lipitor [Internet]. The New York Times. 2011 Aug 3. Available from: [http://www.nytimes.com/2011/08/04/business/pfizer-is-said-to-be-pursuing-nonprescription-lipitor.html?\\_r=1&ref=health](http://www.nytimes.com/2011/08/04/business/pfizer-is-said-to-be-pursuing-nonprescription-lipitor.html?_r=1&ref=health)

## What’s New on the Label?

Zocor® (simvastatin), Simcor® (niacin/simvastatin), and Vytorin® (ezetimibe/simvastatin) received stronger dosing requirements earlier this year because of the increased risk of myopathy associated with simvastatin 80 mg, which is the most potent generic dose available. There is only a 6% increase in LDL-lowering potency when switching from simvastatin 40 mg to 80 mg; however, the risk of myopathy increases 7-fold. Although people who have been taking simvastatin 80 mg for at least 1 year without experiencing myopathy can continue to take this dose, the maximum dose for all other patients is 40 mg. According to the FDA, patients taking simvastatin 80 mg should not stop taking their medication without discussing it with their physician and should report any myopathy, weakness, dark urine, or unexplained fatigue to him or her. Changes to the label include the following:



- Posaconazole was not on the label but is now contraindicated with simvastatin.
- Gemfibrozil, cyclosporine, and danazol could be taken with 10 mg of simvastatin but are now contraindicated.
- Amiodarone and verapamil could be taken with 20 mg of simvastatin according to the old label; however, the dose of simvastatin should not be more than 10 mg now.
- Diltiazem cannot be taken with more than 10 mg of simvastatin instead of the previously recommended 40 mg.
- The dose of simvastatin should not be more than 20 mg when given with amlodipine and ranolazine.

\*\*Note: Amiodarone, verapamil, and diltiazem can’t be taken with Simcor® because it only comes in 20 and 40 mg of simvastatin.\*\*

1. FDA Drug Safety Communication: New restrictions, contraindications, and dose limitations for Zocor (simvastatin) to reduce the risk of muscle injury [Internet]. U.S. Food and Drug Administration. 2011 Jun 8. Available from: <http://www.fda.gov/Drugs/DrugSafety/ucm256581.htm>.
2. Statins. Pharmacist’s Letter. 2011 Jul; 27. Available from: <http://pharmacistsletter.therapeuticresearch.com/pl/ArticleDD.aspx?nidchk=1&cs=STUDENT&s=PL&pt=6&fpt=31&dd=270712&pb=PL&searchid=28953138>.



## **The last “dose” ...**

*“It is a scientific fact that your body will not absorb cholesterol if you take it from another person’s plate.” - Dave Barry*

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