

## PATIENT INFORMATION

# CHOLESTEROL

### ***WHAT IS IT?***

Cholesterol is a waxy, odorless substance that is found in certain foods. A small amount of cholesterol is needed by the body to help maintain nerve cells and synthesize natural hormones. When cholesterol levels in the blood get too high, however, fatty tissue can be deposited in the arteries, creating problems for the heart and other organs (atherosclerosis).

### ***WHO MAY BE AFFECTED?***

Everyone has some level of cholesterol because the human liver makes it and it is virtually impossible to eliminate every bit of fat from the modern American diet.

Heredity plays an especially important role in determining an individual's cholesterol level. Some people are fortunate to inherit "good genes": their blood cholesterol levels stay low no matter what they eat. Others inherit a tendency toward very high cholesterol; no matter how carefully they eat, it isn't enough to keep their cholesterol levels to move up or down according to what they eat.

### ***WHAT FORMS DOES IT TAKE?***

The total blood cholesterol level; is a single number that includes all the measurable cholesterol in the blood. This includes LDL (the so-called "bad" cholesterol involved in forming atherosclerotic plaques), HDL (the so-called "good" cholesterol which has a protective effect against coronary artery disease, and Triglycerides (the so called "fat" in the blood which has a less clear role in coronary artery disease).

### ***WHAT CAUSES IT?***

High blood cholesterol levels can be caused by certain foods, including fatty cuts of meats (e.g. beef, veal, lamb, pork, ham), skin on chicken, cheese, ice cream, whole milk, butter, and eggs. In general, the more cholesterol put into the body by eating such foods, the higher a person's blood cholesterol concentration will be.

Besides the dietary cholesterol we take in, however, blood cholesterol is also determined by cholesterol the human liver manufactures on its own. Some people's bodies make more cholesterol, or less, than the "average" levels.

## ***WHAT CAN BE DONE?***

If you smoke cigarettes, have a family history of atherosclerosis before age 55, are male, have high blood pressure, diabetes, or obesity, and you do not know your blood cholesterol level, ask your physician to arrange a cholesterol screening.

If you have been told that you have blood cholesterol levels that are too high, follow your physician's advice and these guidelines to reduce your cholesterol levels as much as possible. Even if you are only able to lower your cholesterol by 10% or 15%, that may be enough to reduce your health risk.

## ***WHAT CAN I DO?***

The strategy to reduce the risk of coronary artery disease is to decrease LDL blood cholesterol levels and increase HDL levels:

### **A. Lowering LDL:**

**In general, the LDL goal is less than 130. If you are a diabetic, the recommendation is less than 100. If you have coronary artery disease (e.g. heart attack, stent, bypass surgery) the goal is less than 70.**

- **Eat less saturated fat**

Saturated fats are used by the liver to manufacture cholesterol. Saturated fats are found primarily in animal products-fatty meats, dairy products, and some vegetable products (coconut oil, palm oil, hydrogenated vegetable shortening, avocados). Your intake of saturated fats should be less than 10% of your total calorie intake. Your doctor or nutritionist will help you identify foods high in saturated fats so that you can avoid them.

- **Eat more soluble fiber**

Soluble fiber blocks the body's ability to absorb substances that your liver uses to manufacture cholesterol. Instead of entering the blood stream, these substances become bound to the fiber, which then carries them out of the body in stool. This deprives the liver of materials it needs to manufacture cholesterol, forcing it to use LDL cholesterol from the blood stream instead. This causes your blood cholesterol to go down. Your doctor or nutritionist can recommend foods high in soluble fiber.

- **Eat less cholesterol-rich food.**

Most people do not need to avoid cholesterol entirely in order to lower blood cholesterol, but eating less than 300 mg of cholesterol per day is recommended.

## **B. Elevating HDL:**

**The recommended HDL is greater than 40.**

- **Exercise**

Physical activity is one of the best ways to increase HDL. Your doctor will recommend a regular exercise program.

- **Quit smoking**

Smoking reduces ones HDL.

- **Lose weight**

As your weight goes up, your HDL level tends to decline. You can reverse this by losing weight.

High blood cholesterol is a health risk which can be significantly reduced by following your physician's recommendations and reducing the amount of fatty foods you eat. Your physician may recommend medication if your LDL is too high, or HDL is too low based on your risk.

### ***WHAT ABOUT MEDICATION?***

In many cases your doctor will advise that you take medication if you cholesterol levels are too high. These medications quite are safe, but do require careful monitoring by a physician. These medications include:

- **Statins (also known as HMG CoA reductase inhibitors; e.g. simvastain (Zocor), pravastatin, (Pravachol), atorvastatin, (Lipitor))**

This class of drugs works in the liver to prevent the formation of cholesterol. Statins are most effective at lowering the LDL (bad) cholesterol, but also have modest effects on lowering triglycerides (blood fats) and raising HDL (good) cholesterol.

Most of statins' side effects are mild and generally go away as your body adjusts. Muscle problems and liver abnormalities are rare, but your doctor will order regular liver function tests to check on this.

- **Selective cholesterol absorption inhibitors (e.g. ezetimibe (Zetia))**

This class of cholesterol-lowering medications works by preventing the absorption of cholesterol from the intestine. Selective cholesterol absorption inhibitors are most effective at lowering the LDL (bad) cholesterol, but may also have modest effects on lowering triglycerides (blood fats) and raising HDL (good) cholesterol.

- **Resins (also known as bile acid sequestrant or bile acid-binding drugs; colestipol (Colestid), Colesevelam (WelChol))**

This class of LDL-lowering drugs works in the intestines by promoting increased disposal of cholesterol. Your body uses cholesterol to make bile, an acid used in the digestive process. These medicines bind to bile, so it can't be used during digestion. Also, these medications often require a lot of pills.

- **Fibrates (fibric acid derivatives; e.g. gemfibrozil (Lopid), fenofibrate (Tricor))**

Fibrates are best at lowering triglycerides and in some cases increasing HDL (good cholesterol) levels. These drugs are not very effective in lowering LDL (bad) cholesterol. That is why fibrates are generally used in people whose triglycerides are high or whose HDL is low, after reaching LDL goal. Fibrates are most effective at lowering triglycerides (blood fats). Additionally, they act to raise the levels of HDL (good) cholesterol. Fibrates may be used in combination therapy with the statins.

- **Niacin (nicotinic acid; also know as Vitamin B<sub>3</sub>)**

This drug works in the liver by affecting the production of blood fats. Niacin is prescribed to lower triglycerides and LDL cholesterol and raise HDL ("good") cholesterol.

Niacin side effects may include flushing, itching and stomach upset. Dietary supplement niacin must **not** be used as a substitute for prescription niacin. It should **not** be used for lowering cholesterol because of potential serious side effects. Dietary supplement niacin is not regulated by the U.S. Food and Drug Administration (FDA) the same way that prescription niacin is.