

# Searching for Life's Elixir

*HDL, the "good" cholesterol, seems to play a pivotal role in fighting heart disease by keeping arteries clear of deadly plaque*

BY DAVID BRAND

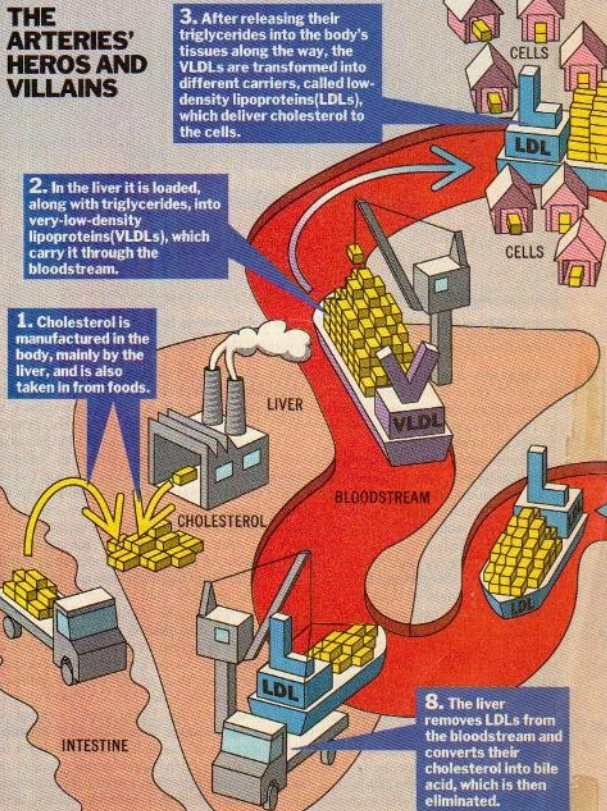
**I**n and around Cincinnati live some 50 families who in an earlier time of myth and legend might have been accused of drinking from Ponce de León's fountain of youth. Yet even in today's pragmatic, scientific world, their arteries do seem to carry an elixir of long life. The members of these families, says investigator Dr. Dennis Sprecher of the University of Cincinnati, "typically live for long periods of time, into their 80s and 90s, with very few instances of heart disease, if indeed they have any at all."

Doctors have discovered that these people carry in their blood a component that seems to protect them against the heart disease that plagues many in the Western world, where affluence has made fatty diets and physical inactivity a common way of life. Rose Sweeney, a head nurse at a Cincinnati hospital, is a member of one of the families. "I eat everything I want," she says. "I don't worry about it as far as affecting my heart or building up plaque in my arteries." Sweeney's mother Regina Darpel, 86, notes that other members of her family have lived well into their 90s. She has the same remarkable blood chemistry; so do Sweeney's five children and her sister.

What do these lucky people have in common? They are united in a pact of longevity by the way their bodies process a waxy, odorless substance present in every human being: cholesterol. Cholesterol? The nemesis of every health-conscious person? The object of a swelling tide of medical diatribes against overeating and underexercising? The primary cause of coronary heart disease, which last year caused 1.5 million heart attacks and 550,000 deaths in the U.S.? How can this be? Isn't cholesterol the enemy?

Well, yes. But it is also becoming evident that cholesterol can be either foe or friend, depending on the way it travels

## THE ARTERIES' HEROS AND VILLAINS





through the body. Cholesterol's sinister image derives from the fact that much of the substance is swept through the bloodstream by potentially damaging carrier particles called LDLs (for low-density lipoproteins). LDLs are called "bad" cholesterol because an excess of cholesterol carried by them can lead to the buildup of harmful deposits in the arteries. The other cholesterol carriers, known as HDLs (for high-density lipoproteins), are considered "good" because, far from being killers, they may actually play a vital role in preventing heart disease. They seem to act like biological vacuum cleaners, sucking up excess cholesterol in the bloodstream. It is because the 50-odd Cincinnati families possess unusually high levels of HDL that they are believed

to have such a resilient blood chemistry—and such long lives.

Americans are acutely aware of cholesterol. During the presidential campaign, George Bush's doctor issued a medical history that included the candidate's total cholesterol and HDL levels (both well within the safe zone). Two books, Robert E. Kowalski's *The 8-Week Cholesterol Cure* and Dr. Kenneth H. Cooper's *Controlling Cholesterol*, have been major sellers this year. The shelves of the nation's grocery stores are lined with products conspicuously labeled "cholesterol free." Oat bran, which moderately lowers cholesterol levels, is selling so

briskly that some manufacturers are working around the clock to meet demand. Essentially, all these nostrums are aimed at reducing total cholesterol. But the

hope is implicit that they will raise the levels of HDL, the good cholesterol, while lowering those of LDL, the bad cholesterol.

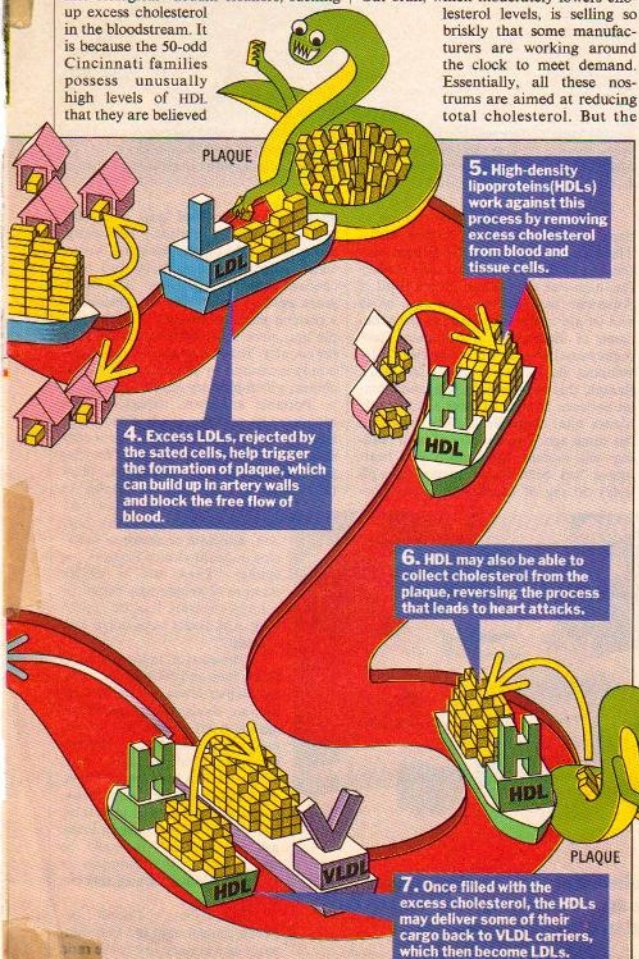
The good and bad labels, however, can be simplistic and misleading. Pure cholesterol is a life-sustaining substance that plays an essential role in building cell membranes and sex hormones as well as aiding digestion. Problems begin when the body is saddled with an excess of LDL, which normally carries some 60% to 80% of the blood's total cholesterol. This excess can trigger the formation of plaque on the interior walls of the coronary arteries, a condition called atherosclerosis. In time, this hardened, sludge-filled growth narrows the artery and allows a clot to form, severely blocking the blood flow. The result: a heart attack.

Clinical studies suggest that cholesterol's role in this lethal process is much more complicated than previously imagined. Some scientists now believe that in certain cases of atherosclerosis, too little HDL may be as important a factor as too much LDL. On the other hand, the higher the level of HDL, the more it may aid in counteracting the effects of the bad cholesterol. This is the view of Dr. William Castelli, medical director of the Framingham Heart Study, a major research project that for the past 40 years has been following the cardiac history of residents of Framingham, Mass. "A number of us," says Castelli, "feel we can do a much better job of predicting who is at risk of getting heart disease if we look at the LDL and the HDL together."

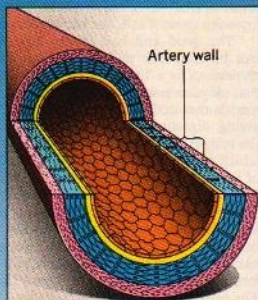
That judgment was reinforced by four new studies presented at the American Heart Association's annual meeting in Washington last month. They confirmed earlier research indicating that low levels of HDL can result in heart disease—even in individuals whose total cholesterol count is in the supposedly "safe" zone below 200 milligrams per deciliter (mg/dl) of blood.

Cholesterol in the bloodstream comes from two sources: it is produced naturally by the body's cells and also results from the intake of foods containing saturated fats or pure cholesterol—for example, butter, cheese, liver, eggs and animal fat. In the Third World, where relatively little saturated fat and cholesterol are consumed, most people seem to be protected from heart disease by low LDL levels. The problem with the Western world's rich diet is that it puts the body into overdrive, so that more LDL cholesterol accumulates in the bloodstream than can be absorbed and used by cells.

The good news is that most people have a large degree of control over their cardiovascular health. For the past two decades, the American Heart Association (A.H.A.) has been urging people to protect their hearts by giving up cigarette smoking,







## HEALTHY ARTERY

**Undamaged inner walls allow for an unimpeded flow of blood.**



**Trouble begins: artery wall, magnified 400 times, showing the first signs of lesions, which appear as tiny beads at top left.**



**Close-up of early lesion: macrophage scavenger cells, magnified 1,100 times, gorge on cholesterol as smooth muscle cells proliferate.**

controlling hypertension and lowering their cholesterol. Many Americans have responded to the first two recommendations. Now, increasingly, they are listening to researchers like Peter Kwiterovich, professor of pediatrics and medicine at Johns Hopkins, who declares, "We have the evidence that if you lower cholesterol, you can prevent heart disease."

That is a message that many Americans obviously need to heed. Although the heart-attack death rate in the U.S. has fallen roughly 3% a year since 1967, too many people are hanging on to the bad old ways. In a report last July, Surgeon General C. Everett Koop warned Americans that they are still consuming too much saturated fat and that their cholesterol counts are too high. A basic problem is that many Americans—79%, according to a Louis Harris poll published earlier this year—do not know what their cholesterol levels should be.

To counter this confusion, the National Heart, Lung and Blood Institute has for the past three years been running a National Cholesterol Education Program. Last year the program set 200 mg/dl as the amount of total cholesterol (essentially LDL plus HDL) above which individuals are considered to be potentially at risk of developing heart disease; those between 200 and 239 are borderline high risk; anyone with a count of 240 or more may be at high risk. The program suggested that everybody should aim for an LDL count of 130 or lower. However, it did not recommend specific HDL targets.

How do Americans measure up to these overall guidelines? Rather badly. The mean cholesterol levels of men over the age of 35 fall well into the borderline-high-risk area. More than a third of American men between the ages of 45 and 64 are in the high-risk category. Because of differences in hormones, premenopausal women run a low risk of developing heart disease. In later years, though, this advantage is lost, and women between 55 and 64 have significantly higher total cholesterol levels than men the same age. The dangers of high readings are evident: the chance of a heart attack has been found to double with every 50 mg/dl increase in blood cho-

lesterol once the level goes over 200.

The picture is gradually improving, however. In 1986 the percentage of Americans whose blood cholesterol had been checked rose to 46%, from 35% three years earlier. Last May a cholesterol-screening program brought 400,000 people into more than 400 hospitals around the country. Total cholesterol is now commonly measured by portable testing machines, which produce results in minutes.

Portable analyzers, though, cannot calculate LDL and HDL levels. Even many laboratories have been unable to give consistently accurate counts of HDL. Yet that figure may be the most vital statistic of all in evaluating cardiovascular health in

otherwise moderate- or low-risk individuals. Says Dr. Bruce Gordon, associate professor of medicine at Manhattan's Rogosin Institute: "There are a sizable number of people who would be inappropriately treated unless their HDL levels were taken into account."

Normal HDL levels are 45 to 50 for men and 50 to 60 for women. Higher levels, in the 70s and 80s, are thought to be protective against heart disease. The studies reported at the A.H.A. meeting presented evidence that, even with a total cholesterol reading in the supposedly safe zone, a person can be at risk if his HDL level is below 35. "If I was going to know just one number, it would be HDL," Dr. Meir J. Stampfer of Harvard Medical School told the conference.

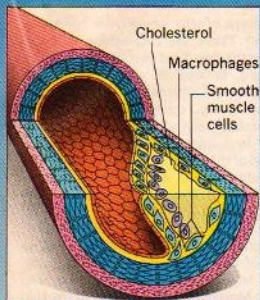
Framingham's Castelli believes, though, that the best indicator of coronary risk is the ratio



## AN OUNCE OF PREVENTION

**Cholesterol and blood-pressure checks can spot high-risk cases and lead to effective treatment.**





## DISEASED ARTERY

**Heavy plaque buildup narrows the opening and restricts blood flow.**



**Serious damage: a sliced-open artery segment reveals a mountainous landscape of thick, yellow, sludge-filled protrusions.**



**Inside view: a color-stained section of plaque. The white balls at top are fats, engulfed by macrophages, which accumulate within the artery wall.**

of total cholesterol to HDL (the total divided by the HDL level; for example, an overall cholesterol reading of 180 and an HDL of 60 produce a ratio of 3). "If your ratio is 4.5 or higher," says Castelli, "you are running a ratio typical of people who develop coronary heart disease in Framingham." Low-risk vegetarians on the average score a ratio of 2.5; marathon runners are slightly higher at 3.4. The average female heart-disease victim comes in at 4.6 to 6.4, and male heart patients at 5.4 to 6.1.

Despite uncertainties about the way HDL functions, there are ample signs that raising HDL levels improves cardiovascular health. Some of the most convincing evidence has come from Finland, which has one of the world's highest rates of heart disease. Last year the first published results from an ongoing eleven-year Helsinki study of 4,081 middle-aged men showed that after five years a 2,051-member test group that was treated with the anticholesterol drug gemfibrozil had an 11% increase in HDL, an 11% decrease in LDL and 34% less heart disease, compared with others in the study who were not treated. "It's actually the first time in the history of medicine," Castelli told a cholesterol conference in Manhattan last June, "that you can show that raising HDL will have as much effect on preventing coronary heart disease as lowering LDL."

Researchers are finding that it is more difficult to increase HDL than to lower overall cholesterol. But they are pursuing some promising avenues—in particular, eating and exercise habits that seem

to stabilize or even raise HDL while bringing down LDL, thus improving the balance between good and bad cholesterol. High-risk patients who are unable to benefit from diet and exercise alone are finding new hope in a handful of drugs that lower bad-cholesterol levels. They include gemfibrozil, lovastatin, cholestyramine and colestipol. Gemfibrozil, besides reducing LDL, appears to have a pronounced HDL-raising effect. Niacin, a common B vitamin, seems to produce similar results, although it can cause such side effects as flushing and stomach disorders.

Michael Bruno of Cincinnati is one heart-disease patient who has benefited from drug therapy. A 55-year-old former

printing-plant foreman, Michael and his brother Daniel, 58, a retired barber in Canonsburg, Pa., have a genetic disorder that results in very high levels of LDL and low levels of HDL. Daniel has suffered a heart attack, and both brothers have had bypass surgery. Now the Brunos are on low-saturated-fat diets and are taking lovastatin. In addition, Michael is taking gemfibrozil. Since the brothers started their programs, Michael's total cholesterol has fallen from 224 to 184, and Daniel's from 325 to 201. Both brothers' HDL levels have gone up sharply. "I can't imagine that I used to sit down to a 1½-lb. T-bone steak," Michael says. "Today that greasy, fatty taste doesn't appeal to me."

Even though HDL's relationship to coronary heart disease was first noted in 1951, many people are still not being advised by their doctors to raise their good-cholesterol levels. The reason, says Dr. Robert Levy, president of New Jersey's Sandoz Research Institute, is that there is no absolute proof that raising HDL alone can lower a person's risk of heart disease. No convincing body of evidence from animal studies has yet demonstrated the value of raising HDL, and no clinical trial to date has specifically targeted humans with low HDL. "Much the same question existed for LDL until this decade, when it was unequivocally shown that lowering LDL decreases the risk," says Levy. The situation is similar with HDL today, he says, "except that with HDL we have not been smart enough yet to set up clinical trials designed to test whether



## A POUND OF CURE

**For severe cases of coronary occlusion, bypass surgery offers a final, drastic solution.**



er raising HDL alone will be beneficial."

One hopeful development is that scientists have learned how to derive synthetic HDL particles from natural HDL made in the body. At the Rogosin Institute, researchers are injecting this compound into rabbits to see if raising HDL protects them against atherosclerosis. Should such experiments succeed, it is conceivable that synthetic HDL could one day become an effective treatment for heart patients. Rogosin's Gordon notes, however, that this research "is still years away from clinical application in man."

Just how HDL plays its apparently vital role in ridding the body of excess cholesterol is not entirely clear. The substance is, after all, only one element in an alphabet soup of particles that make up the so-called lipid transport system, which moves cholesterol through the bloodstream. Though individual cells can make their own cholesterol, much of their supply comes from the bloodstream, arriving from the liver aboard macromolecular ferryboats, known as very-low-density lipoproteins, or VLDLs. These carrier particles are loaded in the liver with cholesterol and dietary fats known as triglycerides, which are used by cells for energy or stored for future use.

As the VLDL boats unload their triglycerides into body tissues, the carriers get progressively smaller, denser and proportionately more cholesterol-rich, ultimately becoming particles of LDL. The LDLs are then pulled out of the bloodstream by special protein receptors on the surface of cells. "These receptors reach out and grab cholesterol like a first baseman catching a ball thrown by a shortstop," says Dr. Michael Brown of the University of Texas Southwestern Medical Center, who, with his colleague Dr. Joseph Goldstein, won a Nobel Prize in 1985 for discovering LDL receptors. What happens to excess LDLs that are not taken up by cells? Under normal conditions, these are swept by the bloodstream through the liver, where they are captured by cell receptors. The LDLs are then converted into bile acids, which are ultimately excreted.

But the transport system's delicate balance can be upset by dietary indulgence. Take the case of a mythical glutton called Fred, who regularly gorges on porterhouse steak, French fries, ice cream and other foods high in saturated fats and cholesterol. Fred may feel great, but every time he eats, his bloodstream is flooded with fatty particles called chylomicrons, which transport triglycerides and cholesterol out of the intestines to the rest of his body. Soon Fred's

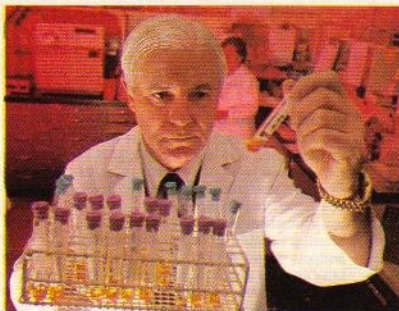
liver is busy mopping up chylomicrons and is unable to cope with excess LDL in the blood. The surfeit of cholesterol particles then begins circulating freely through the body. Unless it is stopped, it can lead to the formation of deadly plaque.

But Fred may be able to counter the effects of his gastric binges if he has enough of the HDL vigilantes in his blood. Largely produced in the liver and the intestines, these flat, disklike particles resemble "empty envelopes waiting to be filled," says Dr. Norman Miller, head of endocrinology at North Carolina's Bowman-Gray School of Medicine. As the VLDL and chylomicron particles unload their triglyceride cargoes into the body's cells, the particles become wrinkled like

high levels of HDL reverse the buildup of plaque? There are indications that this may be the case. Last year Dr. David Blankenhorn, director of atherosclerosis research at the University of Southern California, reported on a study in which 162 nonsmoking men who had undergone coronary-bypass surgery were put on a low-fat diet; 80 of them were also treated with niacin and colestipol. Among the drug-treated group, HDL levels increased 37%, while LDL decreased 43% and triglycerides went down 22%. Blankenhorn found evidence that arterial disease had been halted in 61% of the drug-treated patients, compared with 39% who were treated by diet alone. Moreover, 16% of the drug-treated group, vs. only 3.6% of the others, showed an improvement in the condition of their arteries.

Those dramatic results were not achieved by increasing HDL alone, although Blankenhorn says there is strong evidence that "high HDL is good for you." His study showed that obstructed arteries benefited most from decreased LDL. Lower levels of triglycerides, he found, may also play an important role, a possibility that has emerged from other studies as well. At Baylor College of Medicine in Houston, Dr. Antonio Gotto Jr. discovered that his heart-bypass patients "almost without exception" have lower levels of HDL and slightly higher levels of triglycerides than people without heart disease. One theory is that excess triglycerides somehow mark HDL particles for elimination by the liver. When this occurs, says Gotto, "there is this Pac-man in the liver chewing up the HDL that ordinarily would be chewing up the plaque in the artery walls."

It remains to be seen whether HDL is a life-prolonging elixir or merely a bit player in a metabolic process whose intricate workings are not yet fully understood. The signs so far are encouraging, but the public does not have to wait for all the answers about HDL in order to do something about preventing heart disease. The LDL story, after all, is already clear: the lower the LDL, the lower the risk of heart disease. For most people in the Western world, basic changes in eating habits and life-style can drastically reduce or eliminate the threat of heart attack. Declares Dr. Bernadine Healy, president of the American Heart Association: "More than half the adult population has within its own power the ability to decrease its chances of getting heart disease." That fact alone should make everyone take heart. —Reported by Barbara Dolan/Dallas and J. Madeleine Nash/San Francisco



## IMPROVING PREDICTION METHODS

**Dr. William Castelli, medical director of the Framingham Heart Study, examines blood-plasma samples.**

prunes. In the process, fragments containing proteins, fats and cholesterol break away. It is at this point that the unfilled HDL particles come to the rescue by scooping up the detritus. Researchers believe HDL also removes excess cholesterol from fat-sated cells—perhaps even those in the artery walls.

Once filled, the HDL particles must get their load of cholesterol back to the liver for excretion. Some researchers theorize that cholesterol collected in the HDL particle is transferred to a VLDL ferryboat circulating in the bloodstream; the VLDL then metamorphoses into an LDL, which is picked up by an LDL receptor in the liver. Others think HDL may in fact be a passive player—a sort of biological signal light that indicates how efficiently excess cholesterol is being removed, without necessarily taking any direct role.

If HDL actually does have the ability to pull cholesterol out of artery walls, can



# Take a Walk on the Well Side

How you can eat, drink and jog your way to healthier cholesterol counts

**W**ith its shop-lined main street, baseball field and grassy square, Wellsburg, W. Va., is in many ways a typical American town. Perhaps too typical. A survey last spring found that almost 70% of the Wellsburg area's 11,000 residents were at risk for heart disease. "I was just shocked that my cholesterol was that high," says Kitty Weidner, 75, whose reading was 241 milligrams per deciliter (mg/dl) of blood. Admits store owner Tom Zurbuch, 46, a former junk-food junkie whose cholesterol level was about 265: "Apparently, we haven't been eating right."

But Wellsburg had a change of heart last May, when Bayer, the pharmaceutical company, launched a \$4 million, two-year experiment aimed at improving the townspeople's coronary fitness by teaching them the rudiments of healthy living. The basic rules: throw away the cigarettes, control blood pressure and, perhaps most important, bring down blood-cholesterol levels through diet and exercise programs. Among the first results late this summer: an average 8.3% decline in cholesterol levels.

What's good for the residents of Wellsburg is good for other Americans, who are increasingly getting the message that poor eating and living habits are major contributors to heart disease. Scientists are convinced that well-designed prevention programs can cut the incidence of heart disease in the U.S. by two-thirds, perhaps even more. "Twenty years from now," says Dr. Scott Grundy, a nutrition researcher at the University of Texas Southwestern Medical Center at Dallas, "I expect to see a dramatic reduction in heart attacks."

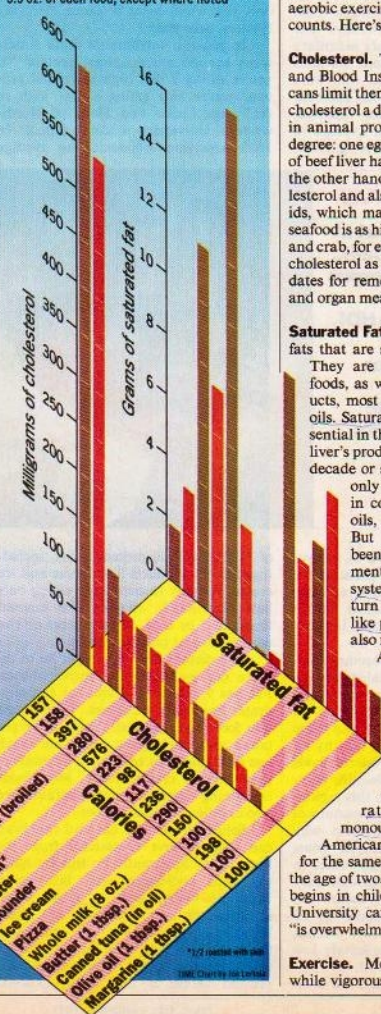
The food industry is slowly adapting to the recommended changes in diet. Some hotels and restaurants now offer low-fat, low-cholesterol menus. Sunshine Biscuits, maker of Hydrox cookies, is no longer using coconut oil in its products and soon plans to eliminate palm oil, both of which are cholesterol-boosting saturated fats.

By next summer an American Heart Association seal of approval may be carried on foods that meet its heart-healthy guidelines.

Although the overall objective is to decrease the amount of total cholesterol in the blood-stream, best results are achieved by lowering levels of LDL, the "bad" cholesterol, while maintaining or increasing levels of HDL, the "good" cholesterol. The

## FACTS ON FATS

3.5 oz. of each food, except where noted



basic approach: cut down on cholesterol and saturated fats in the diet, both of which raise LDL levels, and get regular aerobic exercise, which tends to raise HDL counts. Here's how:

**Cholesterol.** The National Heart, Lung and Blood Institute suggests that Americans limit themselves to 300 mg ( $\frac{1}{4}$  oz.) of cholesterol a day. Cholesterol is found only in animal products, sometimes to a high degree: one egg yolk has 272 mg, and 3 oz. of beef liver has 331 mg. Saltwater fish, on the other hand, are extremely low in cholesterol and also contain omega-3 fatty acids, which may lower LDL levels. Not all seafood is as highly recommended: shrimp and crab, for example, have twice as much cholesterol as fish. Grundy's major candidates for removal from the diet are eggs and organ meats, such as liver.

**Saturated Fats.** Simply stated, these are fats that are solid at room temperature.

They are found in meat and dairy foods, as well as in some plant products, most notably palm and coconut oils. Saturated fats, which are not essential in the human diet, stimulate the liver's production of LDL cholesterol. A decade or so ago, it was believed that only polyunsaturated fats, found in corn, safflower and soybean oils, would lower cholesterol. But the polyunsaturates have been shown in animal experiments to suppress the immune system. Now the advice is to turn more to monounsaturates like peanut and olive oils, which also reduce total cholesterol.

Americans consume an average 37% of their calories in the form of fats, nearly half of them saturated. Grundy and other nutrition experts recommend that fat intake be reduced to 30% of total calories in the diet and be evenly divided among saturated, polyunsaturated and monounsaturated. In 1983 the American Heart Association called for the same 30% limit for children over the age of two. Evidence that heart disease begins in childhood, says Louisiana State University cardiologist Gerald Berenson, "is overwhelming and ominous."

**Exercise.** Most specialists agree that while vigorous exercise only slightly low-



ers LDL levels, it can drive up the HDL count and reduce triglycerides (fatty acids that clinical studies have linked to heart disease). Stanford University medical professor Peter Wood maintains that an increase in physical activity, when accompanied by weight loss, can cause a steady rise in HDL. He advises 30 to 40 minutes of continuous exercise three to five times a week, in which the heart rate is elevated to 70% to 80% of maximum.

But HDL was barely raised in another study, headed by cardiologist Paul Thompson of Brown University. The trial involved eight previously sedentary men whose weight was kept constant through controlled diets and who were put on a regimen of rigorous exercise. After 48 weeks, Thompson reported, HDL levels had gone up an average of only 5 mg/dl. The most striking result

and chocolate, two items that were previously taboo in low-cholesterol diets, need not be given up entirely. One recent study showed that stearic acid, which is found in both the fat of red meat and cocoa butter, does not raise LDL cholesterol. But researchers urge moderation, since these foods also contain palmitic acid, a well-documented cholesterol raiser. In place of fatty meat, nutritionists suggest lean red meat, chicken and turkey—provided the skin of the poultry has been removed and only the white meat is eaten. (Holiday feasters, take heed.)

In general, nutritionists think Americans eat too much animal protein. "If you're eating a diet high in animal protein, you're also eating a diet high in fat," says Linda Van Horn of Northwestern University medical school. In 1985 Americans consumed an average

Studies by Dr. James Anderson, a professor of medicine at the University of Kentucky, showed that a throat-clogging diet that includes 3 oz. of oat bran a day (equal to six cups of cooked oatmeal or about six oat-bran muffins) can lower LDL cholesterol as much as 23%. Another long-term study has shown that 1½ oz. of dry oat bran a day, if taken as part of a cholesterol-lowering diet, raises HDL levels by 10%. Such findings have helped launch a nationwide rush for oat bran and oatmeal.

Inundated with all this information, many consumers can understandably stumble on the road to good nutrition. "They go to McDonald's and order a fish sandwich," says Northwestern's Van Horn, "but how is the fish prepared? It's deep-fat fried, and it's breaded. So the total amount of fat is worse than that in a small hamburger." Others

## PUSHING THE PULSE

**Working up a sweat at a Santa Monica, Calif., health center: vigorous exercise has been shown to drive up HDL counts. For best results, one doctor advises 30 to 40 minutes of aerobic activity three to five times a week.**



of the study was a 16% drop in triglycerides experienced by the participants. Apart from its effect on HDL, exercise clearly improves cardiovascular health by lowering blood pressure and improving glucose metabolism.

How can the dietary recommendations be put to work? Specialists are increasingly looking to the traditional Mediterranean diet, which is rich in fish, grains, fruits, vegetables and olive oil. This diet is regarded as a healthy alternative to such high-cholesterol foods as red meat, eggs and whole-milk dairy products. Much of the fat in this regional fare comes from the monounsaturates in olive oil, which may explain why southern Italians, for example, boast one of the lowest heart-disease rates in the Western world—even though they have HDL levels significantly below the Western average. They appear to be protected by their low LDL counts, which they owe to a diet relatively low in cholesterol and saturated fat.

Some experts feel that lean red meat

of 71 g of animal protein a day, including high-fat products like cheese and ice cream. Grundy recommends eating only half that much, roughly the amount found in 5 or 6 oz. of lean meat or two cups of low-fat cottage cheese.

The dieter's best bet might be to replace fats with complex carbohydrates. Fat has 9 calories a gram, but carbohydrates have only 4 calories. That means that foods like spaghetti, beans, peas, potatoes and whole-grain bread are much less fattening than equivalent amounts of spare ribs or cream cheese. Most foods containing complex carbohydrates are also excellent sources of fiber.

Soluble fibers like oat and rice bran can help remove cholesterol from the body. They apparently do this by binding with cholesterol and bile acids. Insoluble fibers, such as those found in wheat or corn bran, do not affect blood cholesterol. But by increasing the speed at which food passes through the digestive tract, they may help prevent intestinal and colon cancers.

buy margarine that is described as being cholesterol free, not bothering to read the label, which may show that it contains large amounts of saturated fats in the form of palm oil.

Intelligent eating requires careful reading of food labels, says Dallas dietitian and food writer Leni Reed, who takes shoppers around Texas supermarkets teaching them how to do just that. Her most important piece of advice: disregard the label's measuring of fat by weight. Instead, she recommends working out the percentage of total calories that comes from fat.\* For example, a 1-oz. serving of a cheese with a label that proclaims "reduced fat" may indeed be only one-quarter fat by weight. But in terms of calories, it may be 80% fat. "Interpret the fine print," says Reed, "so you won't be fooled by the bold print."

—By David Brand.

Reported by Barbara Dolan/Wellsburg

\*The calculation: number of grams of fat per serving multiplied by 9, divided by total calories per serving, times 100.