

What if bad fat isn't so bad?

No one's ever proved that saturated fat clogs arteries, causes heart disease

By Nina Teicholz, updated 12/13/2007 12:54:50 PM ET

Suppose you were forced to live on a diet of red meat and whole milk. A diet that, all told, was at least 60 percent fat — about half of it saturated. If your first thoughts are of statins and stents, you may want to consider the curious case of the Masai, a nomadic tribe in Kenya and Tanzania.

In the 1960s, a Vanderbilt University scientist named George Mann, M.D., found that Masai men consumed this very diet (supplemented with blood from the cattle they herded). Yet these nomads, who were also very lean, had some of the lowest levels of cholesterol ever measured and were virtually free of heart disease.

Scientists, confused by the finding, argued that the tribe must have certain genetic protections against developing high cholesterol. But when British researchers monitored a group of Masai men who moved to Nairobi and began consuming a more modern diet, they discovered that the men's cholesterol subsequently skyrocketed.

Similar observations were made of the Samburu — another Kenyan tribe — as well as the Fulani of Nigeria. While the findings from these cultures seem to contradict the fact that eating saturated fat leads to heart disease, it may surprise you to know that this "fact" isn't a fact at all. It is, more accurately, a hypothesis from the 1950s that's never been proved. The first scientific indictment of saturated fat came in 1953. That's the year a physiologist named Ancel Keys, Ph.D., published a highly influential paper titled "Atherosclerosis, a Problem in Newer Public Health." Keys wrote that while the total death rate in the United States was declining, the number of deaths due to heart disease was steadily climbing. And to explain why, he presented a comparison of fat intake and heart disease mortality in six countries: the United States, Canada, Australia, England, Italy, and Japan.

The Americans ate the most fat and had the greatest number of deaths from heart disease; the Japanese ate the least fat and had the fewest deaths from heart disease. The other countries fell neatly in between. The higher the fat intake, according to national diet surveys, the higher the rate of heart disease. And vice versa. Keys called this correlation a "remarkable relationship" and began to publicly hypothesize that consumption of fat causes heart disease. This became known as the diet-heart hypothesis.

At the time, plenty of scientists were skeptical of Keys's assertions. One such critic was Jacob Yerushalmy, Ph.D., founder of the biostatistics graduate program at the University of California at Berkeley. In a 1957 paper, Yerushalmy pointed out that while data from the six countries Keys examined seemed to support the diet-heart hypothesis, statistics were actually available for 22 countries. And when all 22 were analyzed, the apparent link between fat consumption and heart disease disappeared.

For example, the death rate from heart disease in Finland was 24 times that of Mexico, even though fat consumption rates in the two nations were similar.

The other salient criticism of Keys's study was that he had observed only a correlation between two phenomena, not a clear causative link. So this left open the possibility that something else — unmeasured or unimagined — was leading to heart disease. After all, Americans did eat more fat than the Japanese, but perhaps they also consumed more sugar and white bread, and watched more television.

Despite the apparent flaws in Keys's argument, the diet-heart hypothesis was compelling, and it was soon heavily promoted by the American Heart Association (AHA) and the media. It offered the worried public a highly educated guess as to why the country was in the midst of a heart-disease epidemic. "People should know the facts," Keys said in a 1961 interview with Time magazine, for which he appeared on the cover. "Then if they want to eat themselves to death, let them."

The seven-countries study, published in 1970, is considered Ancel Keys's landmark achievement. It seemed to lend further credence to the diet-heart hypothesis. In this study, Keys reported that in the seven countries he selected — the United States, Japan, Italy, Greece, Yugoslavia, Finland, and the Netherlands — animal-fat intake was a strong predictor of heart attacks over a 5-year period. Just as important, he noted an association between total cholesterol and heart-disease mortality. This prompted him to conclude that the saturated fats in animal foods — and not other types of fat — raise cholesterol and ultimately lead to heart disease.

Naturally, proponents of the diet-heart hypothesis hailed the study as proof that eating saturated fat leads to heart attacks. But the data was far from rock solid. That's because in three countries (Finland, Greece, and Yugoslavia), the correlation wasn't seen.

For example, eastern Finland had five times as many heart-attack fatalities and twice as much heart disease as western Finland, despite only small differences between the two regions in animal-fat intake and cholesterol levels. And while Keys provided that raw data in his report, he glossed over it as a finding. Perhaps a larger problem, though, was his assumption that saturated fat has an unhealthy effect on cholesterol levels.

Trio of saturated fats

Although more than a dozen types of saturated fat exist, humans predominantly consume three: stearic acid, palmitic acid, and lauric acid. This trio comprises almost 95 percent of the saturated fat in a hunk of prime rib, a slice of bacon, or a piece of chicken skin, and nearly 70 percent of that in butter and whole milk.

Today, it's well established that stearic acid has no effect on cholesterol levels. In fact, stearic acid — which is found in high amounts in cocoa as well as animal fat — is converted to a monounsaturated fat called oleic acid in your liver. This is the same heart-healthy fat found in olive oil. As a result, scientists generally regard this saturated fatty acid as either benign or potentially beneficial to your health.

Palmitic and lauric acid, however, are known to raise total cholesterol. But here's what's rarely reported: Research shows that although both of these saturated fatty acids increase LDL ("bad") cholesterol, they raise HDL ("good") cholesterol just as much, if not more. And this lowers your risk of heart disease. That's because it's commonly believed that LDL cholesterol lays down plaque on your artery walls, while HDL removes it. So increasing both actually reduces the proportion of bad cholesterol in your blood to

the good kind. This may explain why numerous studies have reported that this HDL/LDL ratio is a better predictor of future heart disease than LDL alone.

All of this muddies Keys's claim of a clear connection between saturated-fat intake, cholesterol, and heart disease. If saturated fat doesn't raise cholesterol in such a way that it increases heart-disease risk, then according to the scientific method, the diet-heart hypothesis must be rejected. However, in 1977 it was still a promising idea.

That was the year Congress made it government policy to recommend a low-fat diet, based primarily on the opinions of health experts who supported the diet-heart hypothesis. It was a decision met with much criticism from the scientific community, including the American Medical Association. After all, officially endorsing a low-fat diet could change the eating habits of millions of Americans, and the potential effects of this strategy were widely debated and certainly unproved.

We've spent billions of our tax dollars trying to prove the diet-heart hypothesis. Yet study after study has failed to provide definitive evidence that saturated-fat intake leads to heart disease. The most recent example is the Women's Health Initiative, the government's largest and most expensive (\$725 million) diet study yet. The results, published last year, show that a diet low in total fat and saturated fat had no impact in reducing heart-disease and stroke rates in some 20,000 women who had adhered to the regimen for an average of 8 years.

But this paper, like many others, plays down its own findings and instead points to four studies that, many years ago, apparently did find a link between saturated fat and heart disease. Because of this, it's worth taking a closer look at each.

The Los Angeles VA Hospital Study (1969) This UCLA study of 850 men reported that those who replaced saturated fats with polyunsaturated fats were less likely to die of heart disease and stroke over a 5-year period than were men who didn't alter their diets. However, more of those who changed their diets died of cancer, and the average age of death was the same in both groups. What's more, "through an oversight," the study authors neglected to collect crucial data on smoking habits from about 100 men. They also reported that the men successfully adhered to the diet only half the time.

The Oslo Diet-Heart Study (1970) Two hundred men followed a diet low in saturated fat for 5 years while another group ate as they pleased. The dieters had fewer heart attacks, but there was no difference in total deaths between the two groups.

The Finnish Mental Hospital Study (1979) This trial took place from 1959 to 1971 and appeared to document a reduction in heart disease in psychiatric patients following a "cholesterol-lowering" diet. But the experiment was poorly controlled: Almost half of the 700 participants joined or left the study over its 12-year duration.

The St. Thomas' Atherosclerosis Regression Study (1992) Only 74 men completed this 3-year study conducted at St. Thomas' Hospital, in London. It found a reduction in cardiac events among men with heart disease who adopted a low-fat diet. There's a major caveat, though: Their prescribed diets were also low in sugar.

Flawed studies

These four studies, even though they have serious flaws and are tiny compared with the Women's Health Initiative, are often cited as definitive proof that saturated fats cause heart disease. Many other more recent trials cast doubt on the diet-heart hypothesis. These studies should be considered in the context of all the other research.

In 2000, a respected international group of scientists called the Cochrane Collaboration conducted a "meta-analysis" of the scientific literature on cholesterol-lowering diets. After applying rigorous selection criteria (219 trials were excluded), the group examined 27 studies involving more than 18,000 participants. Although the authors concluded that cutting back on dietary fat may help reduce heart disease, their published data actually shows that diets low in saturated fats have no significant effect on mortality, or even on deaths due to heart attacks.

"I was disappointed that we didn't find something more definitive," says Lee Hooper, Ph.D., who led the Cochrane review. If this exhaustive analysis didn't provide evidence of the dangers of saturated fat, says Hooper, it was probably because the studies reviewed didn't last long enough, or perhaps because the participants didn't lower their saturated-fat intake enough. Of course, there is a third possibility, which Hooper doesn't mention: The diet-heart hypothesis is incorrect.

Ronald Krauss, M.D., won't say saturated fats are good for you. "But," he concedes, "we don't have convincing evidence that they're bad, either."

For 30 years, Dr. Krauss — an adjunct professor of nutritional sciences at the University of California at Berkeley — has been studying the effect of diet and blood lipids on cardiovascular disease. He points out that while some studies show that replacing saturated fats with unsaturated fats lowers heart-disease risk, this doesn't mean that saturated fats lead to clogged arteries. "It may simply suggest that unsaturated fats are an even healthier option," he says.

But there's more to this story: In 1980, Dr. Krauss and his colleagues discovered that LDL cholesterol is far from the simple "bad" particle it's commonly thought to be. It actually comes in a series of different sizes, known as subfractions. Some LDL subfractions are large and fluffy. Others are small and dense. This distinction is important.

A decade ago, Canadian researchers reported that men with the highest number of small, dense LDL subfractions had four times the risk of developing clogged arteries than those with the fewest. Yet they found no such association for the large, fluffy particles. These findings were confirmed in subsequent studies.

Link to heart disease

Now here's the saturated-fat connection: Dr. Krauss found that when people replace the carbohydrates in their diet with fat — saturated or unsaturated — the number of small, dense LDL particles decreases. This leads to the highly counterintuitive notion that replacing your breakfast cereal with eggs and bacon could actually reduce your risk of heart disease.

Men, more than women, are predisposed to having small, dense LDL. However, the propensity is highly flexible and, according to Dr. Krauss, can be switched on when people eat high-carb, low-fat diets or

switched off when they reduce carbs and eat diets high in fat, including the saturated variety. "There's a subgroup of people at high risk of heart disease who may respond well to diets low in fat," says Dr. Krauss. "But the majority of healthy people seem to derive very little benefit from these low-fat diets, in terms of heart-disease risk factors, unless they also lose weight and exercise. And if a low-fat diet is also loaded with carbs, it can actually result in adverse changes in blood lipids."

While Dr. Krauss is much published and highly respected — he has served twice as chairman of the writing committee of the AHA's dietary guidelines — the far-reaching implications of his work have not been generally acknowledged. "Academic scientists believe saturated fat is bad for you," says Penny Kris-Etherton, Ph.D., a distinguished professor of nutritional studies at Penn State University, citing as evidence the "many studies" she believes show it to be true. But not everyone accepts those studies, and their proponents find it hard to be heard. Kris-Etherton acknowledges that "there's a good deal of reluctance toward accepting evidence suggesting the contrary."

Take, for example, a 2004 Harvard University study of older women with heart disease. Researchers found that the more saturated fat these women consumed, the less likely it was their condition would worsen. Lead study author Dariush Mozaffarian, Ph.D., an assistant professor at Harvard's school of public health, recalls that before the paper was published in the *American Journal of Clinical Nutrition*, he encountered formidable politics from other journals.

"In the nutrition field, it's very difficult to get something published that goes against established dogma," says Mozaffarian. "The dogma says that saturated fat is harmful, but that is not based, to me, on unequivocal evidence." Mozaffarian says he believes it's critical that scientists remain open minded. "Our finding was surprising to us. And when there's a discovery that goes against what's established, it shouldn't be suppressed but rather disseminated and explored as much as possible."

Biased studies

Perhaps the apparent bias against saturated fat is most evident in studies on low-carbohydrate diets. Many versions of this approach are controversial because they place no limitations on saturated-fat intake. As a result, supporters of the diet-heart hypothesis have argued that low-carb diets will increase the risk of heart disease. But published research doesn't show this to be the case. When people on lowcarb diets have been compared head-to-head with those on low-fat diets, the low-carb dieters typically scored significantly better on markers of heart disease, including small, dense LDL cholesterol, HDL/LDL ratio, and triglycerides, which are a measure of the amount of fat circulating in your blood.

For example, in a new 12-week study, University of Connecticut scientists placed overweight men and women on either a low-carb or low-fat diet. Those who followed the low-carb diet consumed 36 grams of saturated fat per day (22 percent of total calories), which represented more than three times the amount in the low-fat diet. Yet despite this considerably greater intake of saturated fat, the low-carb dieters reduced both their number of small, dense LDL cholesterol and their HDL/LDL ratio to a greater degree than those who ate a low-fat diet. In addition, triglycerides decreased by 51 percent in the lowcarb group — compared with 19 percent in the low-fat group.

This finding is worth noting, because even though cholesterol is the most commonly cited risk factor for heart disease, triglyceride levels may be equally relevant. In a 40-year study at the University of Hawaii,

scientists found that low triglyceride levels at middle age best predicted "exceptional survival" — defined as living until age 85 without suffering from a major disease.

According to lead study author Jeff Volek, Ph.D., R.D., two factors influence the amount of fat coursing through your veins. The first, of course, is the amount of fat you eat. But the more important factor is less obvious. Turns out, your body makes fat from carbohydrates. It works like this: The carbs you eat (particularly starches and sugar) are absorbed into your bloodstream as sugar. As your carb intake rises, so does your blood sugar. This causes your body to release the hormone insulin. Insulin's job is to return your blood sugar to normal, but it also signals your body to store fat. As a result, your liver starts converting excess blood sugar to triglycerides, or fat.

All of which helps explain why the low-carb dieters in Volek's study had a greater loss of fat in their blood. Restricting carbs keeps insulin levels low, which lowers your internal production of fat and allows more of the fat you do eat to be burned for energy.

Yet even with this emerging data and the lack of scientific support for the diet-heart hypothesis, the latest AHA dietary guidelines have reduced the recommended amount of saturated fat from 10 percent of daily calories to 7 percent or less. "The idea was to encourage people to decrease their saturated-fat intake even further, because there's a linear relationship between saturated-fat intake and LDL cholesterol," says Alice H. Lichtenstein, Ph.D., Sc.D., who led the AHA nutrition committee that wrote the recommendation.

What about Krauss's findings that not all LDL is equal? Lichtenstein says that her committee didn't address them, but that it might in the future.

It could be that it's not bad foods that cause heart disease, it's bad habits. After all, in Volek's study, participants who followed the low-fat diet — which was high in carbs — also decreased their triglycerides. "The key factor is that they weren't overeating," says Volek. "This allowed the carbohydrates to be used for energy rather than converted to fat." Perhaps this is the most important point of all. If you consistently consume more calories than you burn, and you gain weight, your risk of heart disease will increase — whether you favor eating saturated fats, carbs, or both.

But if you're living a healthy lifestyle — you aren't overweight, you don't smoke, you exercise regularly — then the composition of your diet may matter much less. And, based on the research of Volek and Dr. Krauss, a weight-loss or -maintenance diet in which some carbohydrates are replaced with fat — even if it's saturated — will reduce markers of heart-disease risk more than if you followed a low-fat, high-carb diet.

"The message isn't that you should gorge on butter, bacon, and cheese," says Volek. "It's that there's no scientific reason that natural foods containing saturated fat can't, or shouldn't, be part of a healthy diet."

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