

**“FATS AND THE PREVENTION OF CORONARY
HEART DISEASE”**

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Epidemiology is the branch of medicine that investigates the causes and risks of disease within populations. In many instances, epidemiologists can also identify potentially beneficial factors within the population at risk for a certain disease. In other words, there may be behaviors or other considerations that reduce the chances of developing certain disorders.

Coronary heart disease is a common illness in western societies that takes an enormous toll in disability and death. Indeed, someone has a heart attack about every 30 seconds or so in this country from one form or another of cardiovascular disease. The cost to our country in human life is staggering, as is the economic burden.

Epidemiologists have identified a large number of “risk factors” for developing coronary heart disease in our populations at risk. The most important modifiable risk factors are excessive dietary fat consumption, tobacco cigarette smoking, high blood cholesterol or an abnormal blood lipid profile, a sedentary life style, obesity, stress, hypertension, diabetes and other considerations.

In the 1970s, clinical epidemiologists evaluated the population of Eskimos living in Greenland. Eskimos in this setting have an extremely low mortality rate from coronary heart disease. The purpose of these early studies was to identify those factors within this population that would help explain this low rate of heart disease.

For several decades now, it has been an ongoing public health initiative, led primarily by the American Heart Association, to lower fat intake in the American diet. Over the years, some substantial inroads have been made to achieve that goal.

One of the first major surprises of these studies on Eskimos was that their diet was not low in fat. They consumed about 39 percent of their total caloric intake as fat. That amount of total fat intake was comparable to the fat intake of western societies, which generally averaged about 35 to 45 percent at the time the first study was undertaken.

On further analyses, it was learned that the type of fat consumed by Eskimos in Greenland was significantly different in character, if not in amount, than that consumed by western societies. For instance, “heart-harmful” dietary saturated fatty acids in the Eskimo diet were below 9 percent of total caloric intake, compared to greater than 22 percent intake in western societies.

Most importantly, one particularly important class of fatty acids, the omega-3 fatty acids, appeared to offer the best explanation for how a high fat intake could be “heart healthy.”

Fatty acids are made up of a long chain of hydrocarbon atoms, with an acid type group of atoms at one end. In nature, there may be anywhere from two to 28 carbon atoms in this chain, with the most abundant fatty acids having 16 to 18 hydrocarbon atoms.

The end of the fatty acid that does not have the acid-like group is called the “omega” end. In the omega numbering system, the carbon atoms are numbered sequentially or in order, starting at the omega end.

Fatty acids can be “saturated,” which means all of the carbon atoms have a full complement of hydrogen atoms attached. Saturated fatty acids, which are generally “heart unhealthy,” come primarily from animal products.

When a fatty acid is “unsaturated,” it means at least two or more of the carbon atoms are missing their hydrogen atoms. Instead of hydrogen atoms, they have a “double bond” between two carbon atoms.

If a fatty acid is “monounsaturated,” it means it has only one double bond. Monounsaturated fatty acids are very “heart healthy,” and retard the build-up of atherosclerotic plaques. Monounsaturated fatty acids, especially those derived from olive oil, are the cornerstone of the very heart-healthy Mediterranean diet.

If a fatty acid is “polyunsaturated,” it has multiple double bonds. Polyunsaturated fatty acids are usually abbreviated as “PUFAs” in the medical literature. Polyunsaturated fatty acids may be either omega-3 fatty acids, where they have their first double bond at the third carbon atom in the omega numerical system, or they may be omega-6 fatty acids, where the first double bond occurs at the sixth carbon position. Most polyunsaturated fatty acids come from vegetables.

Omega-3 PUFAs protect the heart by several different mechanisms. They are “antiarrhythmic,” which means that they stabilize the electrical activity of the heart muscle. In the presence of a heart attack, then, the heart rhythm remains stable and the chances of “sudden death” are greatly diminished. In laboratory animals given

experimental heart attacks, the occurrence of fatal heart rhythms was reduced greater than ten-fold by administration of oils containing omega-3 PUFAs.

Omega-3 PUFAs also prevent blood from clotting. Thus, the chances of occluding a hardened coronary artery with a blood clot are greatly reduced by omega-3 PUFAs.

Omega-3 PUFAs also retard or slow down hardening of the arteries, reducing atherosclerotic plaque build-up. They do this as effectively as many lipid-lowering medications.

Omega-3 PUFAs also directly influence the metabolism of cholesterol directly, lowering total cholesterol and “bad” LDL-cholesterol levels.

In the Eskimo population of Greenland, the primary source of omega-3 PUFAs was fish. Indeed, the Eskimos dietary intake of omega-3 PUFAs was about six-fold higher than that found in western diets.

The best fish sources of omega-3 PUFAs are mackerel, herring, halibut, and salmon. Plant sources of omega-3 PUFAs are some of the legumes (especially pinto beans and soy beans) and nuts or seeds (especially walnuts and flaxseed). Leeks and leafy purslane are also excellent sources.

Canola, flaxseed, and soybean oils in salad dressings are also good sources. Cod liver oil is a good supplemental source, but it is also very high in vitamin D and vitamin A.

For those who do not like fish, or do not enjoy the vegetable sources of omega-3 PUFAs, omega-3 PUFAs may be taken in capsular form (750-1,000 mg total EPA) as dietary supplements.

Ideally, eating fish twice a week is the best way to get the omega-3 PUFAs you need. There is a threshold level that can be met by two fish meals, and consuming greater amounts is not that much more beneficial.