

# Japanese diet rich in fish may hold secret to healthy heart

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If you're fishing for ways to reduce the risk of heart disease, you might start with the seafood-rich diet typically served up in Japan. According to new research, a lifetime of eating tuna, sardines, salmon and other fish appears to protect Japanese men against clogged arteries, despite other cardiovascular risk factors.

The research, published in the August 5, 2008, issue of *Journal of the American College of Cardiology (JACC)*, suggests that the protection comes from omega-3 fatty acids found in abundance in oily fish. In the first international study of its kind, researchers found that compared to middle-aged white men or Japanese-American men living in the United States, Japanese men living in Japan had twice the blood levels of omega-3 fatty acids—a finding that was independently linked to low levels of atherosclerosis.

"The death rate from coronary heart disease in Japan has always been puzzlingly low," said Akira Sekikawa, M.D., Ph.D, an assistant professor of epidemiology at the University of Pittsburgh, PA, and an adjunct associate professor at Shiga University of Medical Science, Otsu, Japan. "Our study suggests that the very low rates of coronary heart disease among Japanese living in Japan may be due to their lifelong high consumption of fish."

Japanese people eat about 3 ounces of fish daily, on average, while typical Americans eat fish perhaps twice a week. Nutritional studies show that the intake of omega-3 fatty acids from fish averages 1.3 grams

per day in Japan, as compared to 0.2 grams per day in the United States.

Earlier studies by Dr. Sekikawa's team showed that Japanese men had significantly less cholesterol build-up in their arteries when compared to white men living in the United States—despite similar blood cholesterol and blood pressure readings, similar rates of diabetes and much higher rates of cigarette smoking. It was unclear, however, whether Japanese men were protected by strong genes, a high-fish diet or some other factor.

To answer that question, the ERA JUMP (Electron-Beam Tomography, Risk Factor Assessment Among Japanese and U.S. Men in the Post-World War II Birth Cohort) Study enrolled 868 randomly selected men aged 40 to 49. Of these, 281 were Japanese men from Kusatsu, Shiga, Japan; 306 were white men from Allegheny County, Pennsylvania; and 281 were third- or fourth-generation Japanese-American men from Honolulu, Hawaii.

All study participants had a physical examination, completed a lifestyle questionnaire, and had standard blood tests to evaluate cardiovascular health. Laboratory tests also measured total blood levels of fatty acids and the omega-3 fatty acids that come from fish (specifically, eicosapentaenoic, docosahexaenoic and docosapentaenoic acids).

In addition, researchers used two techniques to measure the level of cholesterol build-up in the arteries. In the first test, ultrasound waves gauged the thickness of the walls of the carotid arteries in the neck, a test known as intimal-medial thickness (IMT). In the second test, an electron-beam CT scanner measured calcium deposits, or "hardened" cholesterol, in the arteries of the heart, a test known as coronary artery calcification (CAC). Both have been shown to identify people at high risk for heart disease.

Dr. Sekikawa and his colleagues found that the total level of fatty acids was similar in the three groups, but the percentage represented by fish-based omega-3 fatty acids was two-fold higher in Japanese men living in Japan (9.2 percent) when compared to white men (3.9 percent) and Japanese-American men (4.8 percent) living in the United States.

The researchers also found that levels of atherosclerosis were similar in Japanese-American and white men, but markedly lower in Japanese men living in Japan. The average IMT was 37  $\mu\text{m}$  less in Japanese than white men after age and cardiovascular risk factors were taken into account, while the average risk-adjusted difference in the proportion of Japanese and white men with positive CAC tests was 11 percent. Both gaps were highly significant, but became statistically insignificant when differences in omega-3 fatty acid levels were taken into account.

In Japanese men living in Japan the investigators also observed that IMT values went down as omega-3 fatty acid levels went up, an inverse relationship that was found to be statistically significant. This relationship between omega-3 fatty acid levels and IMT remained significant even after adjusting for traditional cardiovascular risk factors. (In Japanese men, CAC also went down as omega-3 fatty acid levels went up, but the relationship was not statistically significant.)

No significant inverse association between omega-3 fatty acid levels and atherosclerosis was observed in whites or Japanese-Americans once cardiovascular risk factors were accounted for.

"Our study clearly demonstrated that whites and Japanese-Americans have similar levels of atherosclerosis, which are much higher than in the Japanese in Japan," Dr. Sekikawa said. "This indicates that much lower death rates from coronary heart disease in the Japanese in Japan is very unlikely due to genetic factors."

The importance of the fish-derived omega-3 fatty acids in reducing risk for heart disease is powerfully underscored by this cross-cultural study, said William S. Harris, Ph.D., senior scientist and director of the Metabolism and Nutrition Research Center, Sanford Research/University of South Dakota, Sioux Falls. "Japanese men in Japan have equally bad or worse cardiovascular risk profiles as Americans, but less heart disease? How can this be?" said Dr. Harris, who was not involved in the ERA JUMP study. "What really distinguishes the Japanese men from the Americans is the fact that blood levels of the omega-3 fatty acids are twice as high in Japan as they are in the West.

"The take home message from this important study is this: Traditional risk factors lead to traditional amounts of artery-clogging plaque but only when the background diet, perhaps the lifetime diet, is chronically deficient in omega-3 fatty acids. Increase the omega-3 intake and heart disease rates in the West should begin to move closer to those in Japan. While it may take a high omega-3 diet from birth (as opposed to popping a few fish oil pills) to reach this goal, Dr. Sekikawa and his colleagues tell a compelling story that we would do well to heed."

A follow-up study has recently been funded and will test the association of omega-3 fatty acids with the progression of atherosclerosis in white men, Japanese-American men, and Japanese men living in Japan.

Source: American College of Cardiology

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