

Benefits of Omega-3 Fatty Acids from Fish in Type 2 Diabetes

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This year, one million people in the U.S. will be diagnosed with diabetes. Already, nine of every 100 people over the age of 20 have the disease or its early warning signs. There are now 50% more people with the disease than there were 10 years ago. As one gets older, type 2 diabetes is more likely if one is overweight or has high blood pressure (hypertension), elevated blood lipids, and a sedentary lifestyle. With 17 million people having diabetes, better prevention and treatment are urgently needed. New evidence indicates that the oils in fat-rich fish may help combat this scourge.

Fasting Blood Sugar Levels

Diabetes is a disorder of carbohydrate metabolism in which blood sugar levels are above normal.

Normal	< 110 mg/dL*
Above normal	> 110 mg/dL and < 126 mg/dL
Provisional Diabetes	≥ 126 mg/dL

*d/L or deciliter = 100 ml

What Is Type 2 Diabetes?

Diabetes is a disease of carbohydrate metabolism whose hallmark is high blood sugar. Type 1 diabetes reflects lack of insulin, the hormone that controls blood sugar. Type 1 diabetes is excluded from this discussion. In type 2 diabetes, which is much more common than type 1, insulin is present, but it functions improperly. As a result, blood sugar levels rise. Common symptoms of diabetes are frequent urination, frequent thirst, and weight loss. However, warning signs may occur before the disease is diagnosed. Blood sugar levels used to diagnose diabetes are shown in the box.

High blood sugar reflects insulin resistance. This means the hormone insulin is less effective in assisting the uptake of sugar and fatty acids into tissues. As a result both sugar and fatty acid levels in blood rise. To compensate, the pancreas makes more insulin in an effort to clear the blood sugar. The liver takes up the fatty acids and returns them to the blood as fat hitched to proteins. These are measured clinically as VLDL lipoproteins. In diabetes, VLDL levels are markedly increased, thereby increasing the likelihood of heart disease. As diabetes progresses, the pancreas loses its ability to produce insulin. This leads to deterioration in other tissues and the development of circulatory problems, hypertension, kidney disease, impaired regulation of blood clotting, retinopathy, and above all heart disease. Treatment with drugs, diet, weight loss, and exercise can retard and possibly halt this chain of events.

Preventing and Treating Diabetes

People with diabetes are 6 times more likely to suffer a first heart attack and 3 to 8 times more likely to die from heart disease than those without the disease. For this reason, diabetes treatment focuses on managing glucose and insulin levels and preventing heart disease.

Many drugs are highly effective when used to reduce blood sugar, improve insulin action, lower blood pressure and lipids, and improve circulation. Some medications, such as ACE inhibitors used to lower blood pressure, reduce risk of heart disease more than occurs just by lowering blood pressure. Diet can sometimes boost the effectiveness of medications and reduce the dosage required. Taking your lifestyle in hand can be even more helpful. A study in the *New England Journal of Medicine*, in February 2002, examined diabetes prevention in people at risk for

diabetes by comparing lifestyle change with a glucose-lowering drug. Both groups were compared to subjects given a “dummy” pill. After nearly 3 years, people who altered their lifestyle without medication had 58% fewer diabetics. Those on the sugar-lowering drug had 31% fewer. Adopting a healthy lifestyle can make a huge difference! Here is what works:

Lifestyle intervention means weight loss, regular exercise, and healthful eating habits. Weight loss deserves high priority because 80% of people with diabetes are overweight or have abdominal obesity. Losing weight reduces the chance of developing diabetes, slows its progression, and improves glucose control. Other benefits of weight loss are reduced blood pressure, improved blood lipids, and lower chance of heart arrhythmias. The more weight you lose, the better. Even modest weight loss – short of reaching your ideal weight – brings substantial improvement.

Regular exercise counteracts many of the detrimental effects of insulin resistance. It improves glucose control and blood lipid levels, increases blood flow and vascular function, boosts fitness, reduces risk of heart disease, and can ease weight loss. As a bonus, you feel better! There is some controversy about how much, how long, and how often to exercise. Thirty to 60 minute sessions of modest intensity exercise 3-4 times a week is a good start. Intensity should be increased gradually. Caution: everyone’s health condition and risk differs, so if you have diabetes or heart disease, have your physician determine the appropriate level, type, and frequency of exercise.

Diet modification is a frontline strategy for controlling diabetes. Traditionally, the diabetic diet emphasized sugar restriction. Modern dietary recommendations recognize that the total amount of carbohydrate is more important than the type of carbohydrate. Diets very low in carbohydrates tend to be high in fat and therefore associated with weight gain and heart disease. Choosing foods by their glycemic index, a measure of their ability to produce a sharp rise in blood glucose, is controversial and an unreliable guide to meal planning. The key is moderate carbohydrate intake from whole grains, legumes, fruits, and vegetables. These foods generally have the lowest glycemic index.

Many scientists put *limiting saturated fat intake* at the top of the list because these fats are strongly linked with heart disease. Foods high in saturated fats include dairy fats – butter, most cheese, and whole milk – most animal fats, hard margarines, shortening, and coconut and palm oils. Trans fatty acids also aid the development of heart disease. Trans fatty acids occur in the manufacture of solid fats such as margarine and shortening. Many commercial and restaurant-prepared fried and baked foods have high proportions of saturated and trans fatty acids. Restricting the consumption of saturated and trans fats improves blood lipid levels and may slow the progression of diabetes.

Diabetes occurs more frequently in people who eat the most fat. Limiting how much fat you consume may make it easier to lose weight and may improve some diabetic parameters. Using mainly monounsaturated fats, such as those in olive, canola, and high oleic acid oils, while restricting saturated fats is wise. Eating fat-rich fish at least twice a week adds healthful omega-3 fatty acids. The rest of a healthful diabetic diet includes plenty of lean protein-rich foods such as poultry, fish, and legumes. These foods do not raise blood glucose levels.

Omega-3 fatty acids, found mainly in fat-rich fish such as salmon, rainbow trout, mackerel, and sardines confer health benefits not found in other foods. “Omega-3s” from fish are highly polyunsaturated fatty acids that lower triglycerides, reduce abnormal heart rhythms, reduce blood pressure by small but significant amounts, and improve blood clotting regulation. In a large study of more than 11,000 people with heart disease, the daily consumption of about one gram of fish oil reduced cardiovascular mortality by 30% and sudden cardiac death by 45%. A gram of fish oil is equivalent to a 3 ounce serving of salmon. Omega-3s may also boost the effectiveness of statins, drugs widely prescribed to lower blood LDL cholesterol levels.

Studying populations such as the Alaskan and Greenland Inuit, who frequently eat fatty fish or marine animals rich in omega-3s, has taught us a great deal. Traditionally, these native people have had very little cardiovascular disease or diabetes. Japanese, who also consume large amounts of fish, have much lower rates of heart disease and diabetes than Americans. As these populations adopt western eating habits and exercise less, their prevalence of obesity and diabetes soars. Could the onset of diabetes be changed if native people at risk for the disease resumed eating more omega-3 rich foods? Dr. Sven Ebbesson of the University of Virginia sought the answer in a study of 44 Alaskan Inuit who had early signs of diabetes – impaired glucose tolerance and excess weight. Inuit were asked to eat fewer foods high in saturated fats and more traditional foods, especially fish and marine animals. After 4 years, not a single person had advanced to type 2 diabetes, in spite of not losing weight. This promising study needs to be confirmed in a larger number of subjects.

Omega-3 fatty acids may be particularly beneficial for overweight people with hypertension who are on weight loss diets. Dr. Trevor Mori and colleagues at the University of Western Australia recently showed that people on a weight loss diet that included fat-rich fish daily had improved glucose and insulin metabolism. People on the same diet without fish had no such improvements. Both groups lost the same amount of weight, but blood pressure reduction was greater among the fish eaters than the non-fish eaters. Even in people not losing weight, the inclusion of fish every day reduced blood pressure. Thus, people with diabetes who eat rich fish on a regular basis can boost the benefits of weight loss in improving glucose control and blood pressure.

Finally, it has been known for years that omega-3s from fish reduce the likelihood of developing blood clots that lead to heart attacks and stroke. They also improve blood circulation. These benefits have been demonstrated in controlled clinical trials and occur without unfavorable changes in glucose or insulin activity. The American Diabetes Association and the American Heart Association advocate eating fatty fish as a safe and effective way to obtain the heart health benefits of omega-3s. Eating fatty fish regularly is an important strategy to improve health in diabetes.

Optional Side Bar

Preventing and Treating Diabetes	
Lifestyle change	<ul style="list-style-type: none">·Weight loss·Regular exercise·Healthful eating
Regular exercise— check first with your doctor	<ul style="list-style-type: none">·30-60 min 3-4 times/week·Moderate intensity
Healthful eating Omega-3 fatty acids	<ul style="list-style-type: none">·Limit foods high in saturated and trans fatty acids·Use olive, canola and high oleic oils·Choose fiber-rich carbohydrates such as whole grains, legumes, fruits and vegetables·Eat fat-rich fish such as salmon two or more times/week