

New FLAX FACTS

ALA AND OTHER OMEGA-3 FATS MAY PROTECT AGAINST ARRHYTHMIA

by Dr. Diane H. Morris

Arrhythmias or dysrhythmias, as they are sometimes called, are abnormal rhythms of the heart muscle. There are many different types of arrhythmias. Some are disconcerting because they cause the heart muscle to skip a beat or add an extra beat, but they are not dangerous. Others are serious, resulting in dizzy spells, shortness of breath, chest pain and other complications.¹ The large number of sudden cardiac deaths from coronary heart disease – estimated at about 8-10% of all deaths in Canada in 1999² and 335,000 deaths per year in the United States³ – are due mainly to arrhythmia.

Growing evidence suggests a simple dietary change – increasing the dietary intake of omega-3 fats – may help prevent sudden death from arrhythmias. The major omega-3 fats are alpha-linolenic acid (ALA), the essential omega-3 fatty acid, and its long-chain cousins, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

The omega-3 fatty acids prevent arrhythmias in heart cells grown in test tubes and also in laboratory animals. In humans, omega-3 fats have been shown to reduce the risk of arrhythmias in most,⁴⁻⁷ but not all,⁸ clinical studies.

How Arrhythmias Occur in the Heart

The heart is a muscle that pumps blood throughout the body. The pumping action of the heart is controlled by electrical signals, which are formed by a special group of cells located in the heart's right upper chamber. These special cells are known collectively as the sinus node.

The sinus node is a natural pacemaker for the heart. Its electrical signals travel first through the upper chambers of the heart (the atria), then through a switching station called the AV node, and finally to the lower chambers of the heart (the ventricles). The ventricles route the electrical signal through special nerve cells, and the end result is a contraction of the heart muscle, which pumps blood through the body.

Arrhythmias occur when the heart's natural pacemaker, the sinus node, develops an unnatural rhythm. In some cases, the sinus node may beat too fast, producing a condition known as tachycardia. In other cases, the sinus node's electrical signal is totally disorganized, causing the atria to contract too quickly. Both conditions are very serious.¹

Omega-3 Fats Protect against Arrhythmia in Test Tube Studies

Omega-3 fats may protect against arrhythmia by helping heart muscle cells remain stable electrically and by preventing them from becoming "hyperexcitable".⁹ In test tube studies of rat heart cells, for example, omega-3 fats decreased the electrical excitability of the heart cells, making them less likely to develop abnormal heart rhythms.^{10,11}

A test tube study of adrenal gland cells taken from cows had similar findings – the major omega-3 fats (ALA, EPA and DHA) reduced the electrical excitability of cells. The omega-3 fats worked by blocking the entry of calcium into the adrenal gland cells. DHA and ALA were better than EPA at blocking calcium entry into these cells.¹² (Calcium works like a pacemaker for cells, much like the sinus node is a pacemaker for the heart.) These findings suggest that the antiarrhythmic effect of omega-3 fats is partly due to their ability to control the electrical activity of cells.

Alpha-Linolenic Acid Is As Effective as EPA and DHA in Animals

Pure preparations of ALA, EPA and DHA are equally good at protecting against fatal arrhythmias in dogs. In one study, pure solutions of ALA, EPA and DHA were infused separately. All three omega-3 fats reduced significantly the occurrence of ventricular fibrillation and protected a majority of dogs from fatal arrhythmias. Infusion of a control fat (soybean oil) failed to protect any animals from fatal arrhythmias.¹³ These findings suggest that omega-3 fats help regulate heart function.

Flax Protects against Ventricular Fibrillation in Rabbits

Rabbits have long been used for the study of diet and coronary heart disease. A recent study tested the cardioprotective effects of flax in rabbits.¹⁴ Rabbits were fed a regular rabbit diet, a regular rabbit diet + milled flax, a regular diet + added cholesterol, or a cholesterol diet + milled flax for up to 16 weeks.

The diets containing milled flax increased the ALA content of heart tissue 3- to 4-fold and lowered the omega-6/omega-3 ratio in heart tissue. Ventricular fibrillation was prevented in rabbits fed the regular



diet + milled flax and reduced in the group fed a cholesterol diet + milled flax. Indeed, there was a negative correlation between the ALA content of heart tissue and the incidence of arrhythmias. That is, rabbits with the greatest amount of ALA in their heart tissue had the fewest arrhythmias.

Rabbits fed milled flax, with or without added cholesterol, also had shorter QT intervals than rabbits fed diets without flax. In these rabbits, the flax diet resulted in a shortened QT interval, meaning that flax had an antiarrhythmic effect.¹⁴

What is a QT Interval?

The QT interval reflects the heart's electrical activity during an electrocardiogram (ECG or EKG). Electrical activity is recorded during the ECG as a pattern of waves. The parts of each wave are labeled by certain letters: P, Q, R, S and T. The QT interval is the time it takes for the electrical signal to pass through the lower chambers of the heart. If the time is longer than normal, a person (or animal) is said to have a long QT interval.¹

Human Studies of Omega-3 Fats and Arrhythmia

Heart disease can be prevented by being active, not smoking, and eating a diet high in fruits, vegetables, nuts, and whole grains and also rich in omega-3 fats from plants and fish.¹⁵ Diets containing fatty fish or at least one fish meal per week are associated with reduced risk of primary cardiac arrest,¹⁶ death from all causes,¹⁷ or sudden death from a heart attack.¹⁸

Now there is evidence that people who eat diets rich in omega-3 fats from fish and plants appear to be protected against fatal arrhythmia. Elderly adults in one study, for example, who regularly ate tuna or other broiled or baked fish had a lower incidence of atrial fibrillation than those who rarely ate such fish. Eating fried fish or fish sandwiches was not linked with a lower risk of atrial fibrillation.⁵ In another study – the Family Heart Study⁶ – men and women who had the highest intakes of plant omega-3 fats had shorter QT intervals than those with the lowest plant omega-3 fat intakes. These findings suggest that omega-3 fats from fish and plants have important benefits for the heart.

Healthy Diets for Healthy Hearts

Omega-3 fats appear to enhance the electrical stability of the heart muscle and to protect against fatal arrhythmia in animals and humans. Evidence suggests that making a small dietary change – namely, regularly eating foods rich in omega-3 fats from flax, other plants and broiled or baked fish (but not fried fish) – helps protect against arrhythmia.

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