The Cardiovascular Benefits of Omega-3 Fatty Acids

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Abstract: Evidence in the biomedical literature supports a role for omega-3 fatty acids in cardiovascular health. Based on the strength of this evidence, the American Heart Association recommends that healthy people eat two servings of fatty fish per week in order to help maintain a healthy cardiovascular system.

The omega-3 fatty acids appear to have positive effects on human health. Evidence in the primary literature suggests roles for these fatty acids in heart health, inflammation, the central nervous system, and in mental health. It is clearly known that omega-3 fatty acids are components of cell membranes and are also involved in some cellular signal transduction processes. Some of the omega-3 fatty acids can be synthesized by humans from other molecules. Those omega-3 fatty acids that cannot be synthesized but are required by humans for normal physiological and biochemical function are termed essential and must be obtained in the diet. Essential omega-3 fatty acids include alpha-linolenic acid, eicosapentaenoic acid, and docosahexaenoic acid. In this mini-review, the role played by omega-3 fatty acids in cardiovascular health will be examined.

There is much evidence in the biomedical literature to show that the omega-3 fatty acids play a role in cardiovascular health (1), and that supplements containing omega-3 fatty acids have beneficial effects on cardiovascular health. These include lowering triglyceride levels (2,3), preventing arrhythmias (4,5) decreasing inflammation (4), decreasing platelet aggregation (clotting) (6), and stabilizing plaques (7). There is also a report that omega-3 fatty acids may lower blood pressure (8), although that observation has not been clearly replicated. The
effect of omega-3 fatty acids on lowering triglyceride levels appears to be most pronounced in people with the highest levels of triglycerides, that is those people with the greatest risk (2).

Omega-3 fatty acids supplements also appear to be helpful in people undergoing treatment for cardiovascular disorders. Omega-3 fatty acids appear to enhance the effect of statin drugs, which are used to lower cholesterol (2,9,10). Published evidence also indicates that omega-3s may be helpful in people with implanted defibrillators, although the results of this work are not yet definitive (11,12,13). At least one study indicated that omega-3s improve results for patients who have undergone bypass surgery (14).

Several studies assessing the effect of specific omega-3 fatty acids on cardiovascular health have been performed. The fatty acids studied were alpha-linolenic acid, eicosapentaenoic acid, and docosahexaenoic acid. Alpha-linolenic acid cannot be synthesized by humans and is required in the diet. In two large studies, one with 45,000 men over a 14 year period and one with 76,000 women over a 10 year period, increases in alpha-linolenic acid intake were associated with significant decreases in cardiovascular disease and fatal cardiovascular disease, respectively (15,16). Two additional large scale studies confirmed these results (17,18) although two studies did not (19,20). Additional research has indicated that alpha-linolenic acid decreases level of C-reactive protein, but not total cholesterol, LDL cholesterol or triglycerol levels (21,22).

Eicosapentaenoic acid and docosahexaenoic acid are long chain omega-3 fatty acids. Although not quite as well studied as alpha-linolenic acid, eicosapentaenoic acid and docosahexaenoic acid have been shown to decrease the risk of arrhythmia and thrombosis, decrease the development of plaque along blood vessel walls, decrease serum triglycerides, decrease inflammation, and to cause a small decrease in blood pressure (23,24).

The observations and studies listed above all require further investigation in order to understand the exact mechanism by which these omega-3 fatty acids function. However, it is clear that omega-3 fatty acids promote heart health and do not appear to have any serious side effects. In fact the benefits of omega-3 fatty acids for cardiovascular health are so convincing that the American Heart Association recommends that healthy people obtain omega-3 fatty acids in their diets by eating fatty fish, such as salmon, twice a week (25). It has been shown that the cardiovascular benefit of eating fatty fish outweighs any risks that may arise from eating fish that may be contaminated with pollutants, such as mercury (26).
Figure Legend: Structures of omega-3 fatty acids that are considered to be heart healthy.

1. Eicosapentaenoic acid

2. Docosahexaenoic acid

3. Alpha-linolenic acid
References


