



Soyfoods & Cardiovascular Disease

Cardiovascular disease (CVD), the largest component of which is coronary heart disease (CHD), is the No. 1 cause of death in the world. However, mortality rates among both men and women vary dramatically among nations. For example, the Russian rate for men is 20 times higher than the rates in China and France [1]. Similar differences exist for women. There is ample evidence indicating that these differences in CVD mortality rates are not the result of genetic differences among populations but rather a result of differences in lifestyle and health-related behaviors (smoking, physical activity, diet, etc.). In support of this conclusion are migration data – the change in risk associated with migrating from high-risk to low-risk countries, and changing rates within the same population.

The influence of lifestyle on CVD allows individuals the opportunity to protect themselves from having a stroke or heart attack. Diet plays a key role in this regard and as discussed in this factsheet, soyfoods can play important roles in heart-healthy diets. Soyfoods contain several components that may help to reduce CVD. These include soy protein, soy fatty acids and soybean isoflavones. Isoflavones, which are found in physiologically-relevant amounts only in soyfoods, are not nutrients but they are biologically active.

Elevated cholesterol is major risk factor for CHD. Each 1 percent reduction in blood cholesterol is thought to reduce risk of heart disease by approximately 2 percent [2, 3].

- Soyfoods reduce blood cholesterol through direct and indirect mechanisms.
- Soy protein directly lowers blood cholesterol levels. This attribute of soy protein was formally recognized by the US Food Administration in 1999 when it approved a health claim for soyfoods and CHD based on the cholesterol-lowering effects of soy protein [4]. Since that time 10 other countries have approved similar health claims.
- Meta-analyses of the clinical research show that soy protein (~25 g/day) lowers low-density-lipoprotein cholesterol (LDL-C) by 4 to 6 percent and also lowers blood triglyceride levels by approximately 5 percent [5-8].
- Soyfoods have a very heart-healthy fatty acid profile. Soybean oil is comprised of approximately 12 percent saturated fat, 29 percent monounsaturated fat, 53 percent omega-6 polyunsaturated fat (linoleic acid) and 6 percent omega-3 polyunsaturated fat (alpha-linolenic acid) [9, 10]. Soyfoods and soybean oil are one of the few good plant sources of both essential fatty acids.
- When substituted for commonly consumed protein sources in Western countries, which tend to be high in saturated fat, soyfoods lower blood LDL-C levels approximately 4 percent because of the improved fatty acid content of the diet [8].



Elevated blood pressure is a major risk factor for CVD. Even modest reductions in blood pressure can significantly reduce risk for CHD, stroke and overall mortality.

- Four meta-analyses of the clinical data have concluded that soyfoods reduce blood pressure [11-14].
- Systolic blood pressure is reduced by approximately 2.5 mmHg in response to soy.
- Diastolic blood pressure is reduced by approximately 1.5 mmHg in response to soy.
- The mechanism by which soy lowers blood pressure has not been identified although one hypothesis is that it results from the peptides formed upon the digestion of soy protein.

There are a number of factors beyond cholesterol and blood pressure, for which the evidence suggests may be predictive of CVD risk. There is evidence that soyfoods favorably affect many of these emerging risk factors although in not all cases is the evidence conclusive.

- A meta-analysis of the clinical research found that soybean isoflavones improve endothelial function (arterial health) in postmenopausal women with impaired endothelial function at baseline, as assessed by flow mediated dilation, in postmenopausal women [15].
- A three-year clinical trial found in that comparison to postmenopausal women consuming milk protein, carotid intima-media thickness (CIMT) was reduced by 16 percent among women consuming 25 g/day of isoflavone-rich soy protein [16]. Subanalysis indicated that the benefits were especially pronounced in young postmenopausal women. In this group, soy reduced CIMT by 68 percent.
- Clinical data suggest that soyfoods may reduce inflammation [17], decrease LDL-C particle size [18], and inhibit LDL-C oxidation [19].

CONCLUSIONS

Soyfoods can play important roles in heart-healthy diets. They provide high-quality protein but their fatty acid profile is much healthier than that provided by animal sources of protein. In addition, soy protein directly lowers LDL-C and possibly blood pressure. Furthermore, soybean isoflavones improve arterial health (endothelial function) and possibly reduce CIMT. Also, there is evidence that soyfoods favorably impact a number of other emerging CVD risk factors such as LDL-C oxidation, LDL-cholesterol particle size and inflammation. Soyfoods should clearly be included in diets designed to reduce risk of developing CVD.



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