



# HerbClip™

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**File: ■ Chocolate (*Theobroma cacao*)**  
**■ Flavonoids**  
**■ Coronary Heart Disease**

**HC 111032-421**

**Date: March 31, 2011**

**RE: Chocolate Consumption Associated Inversely with Coronary Heart Disease**

Djoussé L, Hopkins PN, North KE, Pankow JS, Arnett DK, Ellison RC. Chocolate consumption is inversely associated with prevalent coronary heart disease: the National Heart, Lung, and Blood Institute Family Heart Study. *Clin Nutr.* 2010; [epub ahead of print]. doi: 10.1016/j.clnu.2010.08.005.

Epidemiologic data suggest that flavonoids have a beneficial effect on coronary heart disease (CHD). Studies have linked the intake of dark chocolate (*Theobroma cacao*), which is rich in flavonoids, with a blood pressure-lowering effect and other cardiovascular benefits. Noting that little is known about the effects of the consumption of small amounts of chocolate on CHD as are generally eaten, these authors report on their examination of the association between dietary chocolate intake and prevalent CHD among participants of the National Heart, Lung, and Blood Institute Family Heart Study (NHLBI FHS). The NHLBI FHS, a multicenter, population-based study, was designed to identify and evaluate genetic and nongenetic determinants of CHD, preclinical atherosclerosis, and cardiovascular risk factors.

Included in this study were 4,970 participants aged 25 to 93 years who participated in the NHLBI FHS. Of those, 2,258 were men; CHD prevalence was 10.9%. A staff-administered semiquantitative food frequency questionnaire was used to collect dietary information. The questionnaire asked how often on average the participant ate chocolate bars or pieces: more than 6 per day, 4-6 per day, 2-3 per day, 1 per day, 5-6 per week, 2-4 per week, 1 per week, 1-3 per month, or almost never. Information on other dietary factors such as consumption of non-chocolate candy, fruits, and vegetables was also obtained.

A medical history and an electrocardiogram were used to identify cases of prevalent CHD, which were defined as a self-reported history of myocardial infarction, percutaneous transluminal coronary angioplasty, or coronary artery bypass graft validated by medical records, or abnormal Q waves detected on the electrocardiogram. Physical activity was self-reported. Weight and height, cholesterol, blood pressure, and presence of diabetes were assessed, and information on cigarette smoking, alcohol intake, and education was obtained by interview during a 4-hour clinical evaluation visit.

Frequent chocolate consumption was associated with younger age, higher body mass and energy intake, and lower high-density lipoprotein cholesterol levels, lower frequency of fruit and vegetable consumption, wine consumption, multivitamin use, and higher consumption of nonchocolate candy, saturated fat, and dietary cholesterol.

The authors report an inverse association between frequency of chocolate consumption and prevalent CHD in crude and adjusted models. Compared with subjects who did not report any chocolate intake, odds ratios (ORs) for CHD were 1.01, 0.74, and 0.43 for participants consuming 1-3 times per month, 1-4 times per week, and 5 or more times per week, respectively ( $P$  for trend  $<0.0001$ ), adjusting for age, sex, family CHD risk group, energy intake, education, nonchocolate candy intake, linolenic acid intake, smoking, alcohol intake, exercise, and fruit and vegetable consumption. Exclusion of subjects with diabetes or on weight loss diets did not alter the conclusions. On the other hand, nonchocolate candy consumption was suggestive of an increased prevalence of CHD. Multivariable adjusted ORs were 1.0 (reference), 0.96, 1.05, and 1.49 for nonchocolate candy consumption of 0, 1 to 3 per month, 1 to 4 per week, and 5 and more per week, respectively, adjusting for all the same factors as with chocolate intake.

The authors report that the crude data showed an inverse association between frequency of chocolate intake and prevalent hypertension. However, the association was not evident after adjusting for confounding factors. The authors cite a meta-analysis of randomized trials that support a blood pressure-lowering effect with chocolate consumption.<sup>1</sup> Possible explanations for a lack of such an effect in this study include the fact that the subjects in this study included those with more advanced hypertension than those in the meta-analysis studies, chocolate consumption was self-reported (a possible source of misclassification), there was no differentiation between dark and lighter or milk chocolate, and there was a relatively lower amount of chocolate consumed compared with 10 to 100 g of chocolate used in intervention studies.

The authors also note that because they could not determine polyphenol content of the chocolate consumed, the data cannot be contrasted to other studies investigating larger intakes. Neither can minimal intake required for benefits be calculated. However, the large sample size, the multi-center nature and the availability of multiple CHD risk factors are study strengths. They conclude that consuming smaller amounts of chocolate may have a beneficial effect on CHD.

—Shari Henson

Editor's Note: See the related HC 091033-418: Chocolate Consumption Associated Inversely with Atherosclerotic Plaque.

#### Reference

<sup>1</sup>Desch S, Schmidt J, Kobler D, et al. Effect of cocoa products on blood pressure: systematic review and meta-analysis. *Am J Hypertens*. 2010;23(1):97-103.

The American Botanical Council has chosen not to include the original article.

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