

## More Evidence Dark Chocolate Is Cardioprotective

June 4, 2012 — The blood pressure–lowering and lipid effects of dark chocolate could be an effective — and money-saving — strategy for preventing cardiovascular events in high-risk patients, a new study suggests.

"The findings of this study suggest that the blood pressure lowering and lipid effects of plain dark chocolate could represent an effective and cost effective strategy for the prevention of cardiovascular disease in people with metabolic syndrome (and no diabetes)," the researchers, with senior author Christopher M. Reid, PhD, CCRE Therapeutics, Department of Epidemiology and Preventive Medicine, Monash University, The Alfred Centre, Melbourne, Victoria, Australia, conclude.

"Chocolate benefits from being by and large a pleasant and, hence sustainable, treatment option," they write. "Evidence to date suggests that the chocolate would need to be dark and of at least 60-70% cocoa, or formulated to be enriched with polyphenols."

Dark chocolate, derived from coca beans, is rich in polyphenols, specifically flavonoids that exhibit antihypertensive, anti-inflammatory, antithrombotic, and metabolic effects, all of which may contribute to cardio-protection.

The study was published online May 31 in the *BMJ*.

### Long-Term Effects

Previous studies have shown that dark chocolate consumption may lower blood pressure, but they have been relatively short, only up to a maximum of 18 weeks. Studies have also shown that dark chocolate may decrease total and low-density lipoprotein cholesterol and increase high-density lipoprotein cholesterol, but again, these changes have been explored only in short-term trials.

To determine potential long-term effects of consuming dark chocolate every day, as well as the cost-effectiveness of this strategy, Australian researchers used statistical modeling techniques, particularly a Markov model to which health states ("alive without cardiovascular disease," "alive with cardiovascular disease," "dead from cardiovascular disease," "dead from other causes") and decision analysis (no dark chocolate [control], or with dark chocolate [treatment]) were added.

With each annual cycle, the researchers used risk prediction algorithms and population life tables to estimate how eating dark chocolate every day for 10 years would affect patients with metabolic syndrome.

The study used data on 2013 participants from the Australian Diabetes Obesity and Lifestyles study who had metabolic syndrome, did not have a diagnosis of cardiovascular disease or frank diabetes, and who were not receiving antihypertensive medications.

The patients were relatively young (mean age, 53.6 years) and considered at high risk: They had a mean systolic blood pressure of 141.1 mmHg, mean total cholesterol level of 6.1 mmol/L, mean hemoglobin A1c of 34.4 mmol/mol, and mean waist circumference of 100.4 cm.

The researchers concluded that under the best-case scenario, in which all these patients ate dark chocolate daily for a decade, 70 nonfatal cardiovascular events, including nonfatal stroke and nonfatal myocardial infarction per 10,000 population, as well as 15 cardiovascular related deaths per 10,000 population, could be prevented.

The estimated incremental cost-effectiveness ratio was \$52,500 per years of life saved when \$42 per person per year was assumed to have been spent on a prevention strategy using dark chocolate.

Even if only 80% of individuals with metabolic syndrome adhered to daily consumption of dark chocolate over 10 years, preventing only 55 nonfatal and 10 fatal events per 10,000, it would still be considered an effective and cost-effective intervention strategy, the authors write.

### **Prevention Strategy**

A dark chocolate prevention strategy of \$42 per person per year in a high-risk population would be cost-effective "based on the commonly accepted, albeit arbitrary, threshold of \$50,000 per years of life saved," said the authors.

The \$42 per person per year could be devoted to advertising, education campaigns, or, potentially, subsidization of dark chocolate in this high-risk population, they said.

The authors point out that they did not assess the potential effectiveness of dark chocolate consumption on cardiovascular events other than nonfatal stroke and nonfatal myocardial infarction, such as heart failure.

They also stressed that the effects of dark chocolate consumption on blood pressure and total cholesterol, although beneficial, are not as profound as those of drug interventions.

*The authors have disclosed no relevant financial relationships.*

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