

## Chocolate and the Heart



# Enjoy Xoçai™ Chocolate

## *The Ultimate Antioxidant Chocolate*

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### Healthy Chocolate by Gloria Loring

I have a confession to make. I love chocolate. I really love chocolate. I love chocolate so much I have stashes of dark chocolate hidden in desk drawers. I'm not sure why I hide it. I guess I'm like a squirrel with her acorns: I want to be certain that I have it when I need it. I'd heard that dark chocolate (not all dark chocolate is equal!) has many beneficial properties, but I had no idea how beneficial chocolate could be until I was introduced to Xoçai™ (pronounced show-sigh).

Xoçai combines the health benefits of unprocessed cocoa with some of the world's highest antioxidant fruits, most notably the açai berry from Brazil. The name is derived from the Aztec word for chocolate, Xocolatl, along with the word açai. The ingredients are combined using a patented process that helps them retain their natural antioxidants. Eating one Xoçai nugget is the antioxidant equivalent of eating 3 and a half pounds of spinach.

And just what are the health benefits of unprocessed cocoa and all those antioxidants? Research studies have shown that it assists cardiovascular function, has cancer benefits, boosts respiratory function, helps joint inflammation, decreases LDL "bad" cholesterol, increases serotonin levels which helps fight depression, and helps prevent gum disease and cavities. It's also a sexual stimulant because it increases blood flow. And that's just a partial list!

Dr. Steve Warren knows about the benefits of chocolate. In addition to his full time involvement with geriatrics in nursing homes and assisted living, Dr. Warren developed an "Aging Well" nutritional supplement. He is also known as "Dr. Chocolate." He has been using Xoçai products with his patients, especially those with diabetes. He's seen them lose weight, decrease medication, and significantly improve their Hemoglobin A1c test results. Hemoglobin A1c is a test that measures the amount of excess sugars that cling to proteins in the blood. It's the sugar/protein mix that contributes to diabetes complications such as kidney failure, gangrene, heart disease and blindness. It's recommended that A1c levels be at below "7". Dr. Warren has had patients using Xoçai chocolate reduce their A1c tests from 11 down to 6.8, which is truly amazing.

Research studies from around the world are confirming that cocoa increases the body's sensitivity to insulin and also helps lower blood pressure. In Hypertension magazine, a study by Claudio Ferri and his team in Italy was titled, "Cocoa Reduces Blood Pressure and Insulin Resistance and Improves Endothelium-Dependent

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## Chocolate and the Heart

Vasodilation in Hypertensives.” Another study in the American Journal of Clinical Nutrition found that the “short term administration of dark chocolate is followed by a significant increase in insulin sensitivity and a decrease in blood pressure.” There are hundreds of similar studies.

Xoçai chocolate is helping friends of mine lose weight, just as Dr. Warren’s patients have. On Dr. Warren’s web site, [www. mydrchocolate.com](http://www.mydrchocolate.com), he explains, “The cocoa has chemicals which shut down the cravings for sweets. The brain center is satisfied with the slow release of nutrients in the body, thereby stopping sugar cravings. Once the body realizes how much better you feel with healthy foods you suddenly crave them. It is a positive cycle that continues to grow.”

That is exactly what happened to Xoçai founder Jeannette Brooks, who has Type 2 diabetes. She is the creator of the Pure Delite sugarfree chocolate bar, which she built into a \$150 million retail business. With the demise of the low carb industry, she began researching how to make healthy chocolate that even she, a diabetic, could enjoy guilt-free. Normally, when cocoa is processed, many of its beneficial properties are diminished. So, with the help of researchers and chemists, she combined unprocessed cocoa powder with the açai berry using a patented process that assured the antioxidants weren’t lost. Then she sweetened it with natural sweeteners that cause very little rise in blood sugar.

She’s a walking advertisement for the end result. Jeanette says, “In three years, I’ve lost over 100 pounds drinking our healthy chocolate drink. At first the chocolate helped me feel more energetic plus I felt less hungry. I ate less and because I felt better, I started exercising. I was a size 24. Now I wear a size 8 to 10. I still use the chocolate 5 times a day. It curbs my appetite and satisfies my sweet tooth. My insulin needs have gone from over 100 units a day to just 10 units of Lantus.”

There are presently four Xoçai products, all formulated with 70% unprocessed cocoa and the açai berry. Activ™ is a delicious natural, fat free, chocolate drink that has only 2 grams of sugar per ounce and no preservatives. I drink it three times a day before meals. The Nuggets, with the Açai berry and blue-berry contain only 3 grams of crystallized pure cane sugar. The Xoçai™ Protein Bar provides 10 grams of soy protein with 150 calories and only 2 grams of sugar. The newest product is the Omega Bar with flaxseed which is flavored with orange peel. Researchers believe that at least 60% of North Americans are deficient in Omega-3 fatty acids. The deficiency of omega-3 in the North American diet has been linked to an extensive list of health-related problems sited in over 2,000 scientific studies. The Omega Bar™ is an excellent source of plant-based omega-3 and promotes the necessary balance of essential fatty acids.

In addition to being a singer and actress, and the mother of a son who has had diabetes for 27 years, Gloria Loring is the author of four books for people living with diabetes, the most recent being *Living with Type 2 Diabetes: Moving Past the Fear*, released in 2006.

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## Chocolate and the Heart

### Health Tip: Choose Your Chocolate Carefully It's not all heart-healthy

(HealthDay News) -- Some kinds of chocolate, rich in antioxidants called flavonoids, have been shown to benefit heart health.

But all types of chocolate aren't the same, and too much chocolate can negate any benefits, the Cleveland Clinic says.

The clinic offers this additional information:

- Dark chocolate is richest in flavonoids, so choose dark chocolate over milk chocolate.
- Chocolate does contain fat, but it contains both saturated (unhealthy) and unsaturated (healthy) fats. Chocolate should still only be consumed in small amounts.

Processed chocolate is higher in fat and lower in flavonoids, so avoid candy bars loaded with caramel, peanuts, nougat and other fattening fillings.

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### Chocolate Has Sweet Effect on Blood Flow

#### Arteries function better when the dark delight is consumed, study suggests

SUNDAY, Nov. 4 (HealthDay News) -- Chocolate lovers, take heart: A Japanese study finds that flavonoid-rich dark chocolate can improve coronary blood flow.

The study looked at what's known as coronary flow velocity reserve (CFVR), an indicator of the ability of the coronary arteries to dilate and allow more blood flow in response to medications.

The two-week trial included 39 healthy adults, average age 29, who ate either 550 milligrams per day of dark chocolate versus white chocolate with no flavonoids.

The researchers used Doppler echocardiography to assess CFVR at the start and end of the study. They also measured the participants' blood pressure, blood lipids and two markers of oxidative stress.

Participants who ate dark chocolate showed significantly improved CFVR after two weeks, while those who ate white chocolate showed no change, the study found.

'Flavonoid-rich dark chocolate intake had acute effects in improving coronary function in healthy adults, as compared to non-flavonoid white chocolate, independent of changes in oxidative stress parameters, blood pressure and lipid profile,' wrote the researchers from Chiba University.

However, they noted that difficulties in blinding (preventing participants from knowing which kind of chocolate they were eating) may have affected the results.

The study was to be presented Sunday at the American Heart Association annual meeting in Orlando, Fla.

## Chocolate and the Heart

### A Little Dark Chocolate Does A Heart Good

#### It sweetly staves off hardening of the arteries in smokers, study finds

TUESDAY, Dec. 20 (HealthDay News) -- Just in time for the candy-clogged holidays, a new Swiss study finds a little dark chocolate each day could slow hardening of the arteries in smokers.

Chocolate is still no substitute for quitting smoking, of course, and the researchers add that the findings are *not* an excuse to binge on fattening sweets.

However, the results do 'provide new important information about the potential beneficial effects of cocoa,' said study author Dr. Roberto Corti, from the University Hospital in Zurich.

His team assigned 20 male smokers to either eat about 1.5 ounces of white chocolate or dark, then evaluated the effects of each on blood flow and other parameters. Before the men ate the chocolate, they were instructed to abstain for a full day from other foods that are rich in the same antioxidants found in cocoa. Those foods include apples, other cocoa products and onions.

Then researchers then subjected the smokers to ultrasound scans and blood tests.

Two hours after the men finished eating the dark chocolate, the scans showed improved smoothness of the blood flow through the arteries -- an effect that lasted eight hours, according to the report published in the January issue of *Heart*.

The dark chocolate also halved blood platelet activity, which in turn decreased the risk of blood clots. Antioxidant levels in the blood also rose among those who ate dark chocolate.

White chocolate did not have those effects, however.

A daily sweet chocolate snack is no substitute for stopping smoking, Corti stressed.

Another expert agreed. 'In my view, dark chocolate can be included as part of an overall heart-healthy diet -- for instance, adequately balancing its calories with a decrease in other desserts and snack foods,' said Jeffrey Blumberg, director of the Antioxidants Research Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, in Boston.

But he said that although dark chocolate contains high levels of flavonoid antioxidants, 'it is not a health food, per se, because of its negative attributes -- that is, fat and sugar. Further, I feel the only appropriate advice to smokers is to quit smoking.'

Previous research conducted by Blumberg showed dark chocolate can help lower blood pressure. In that study, his team asked 10 men and women to eat 3.5 ounces of dark chocolate every day for 15 days. All of the people in the study had high blood pressure, but weren't on medication to treat it.

After eating chocolate for 15 days, participants displayed an average drop of 11.6 millimeters of mercury in systolic blood pressure (the top number in the reading), and an 8.5 millimeter-drop in their diastolic pressure (the bottom number).

Another study, published in 2004, found that eating 1.6 ounces of dark chocolate every day for two weeks caused a healthy 10 percent increase in arterial blood flow.

Experts also note that milk chocolate has a much lower level of flavonoid antioxidants than the dark variety.

Dark chocolate, according to Corti, has more antioxidants per gram than other antioxidant-rich foods such as red wine, green tea and berry fruits. But he is talking about only a bit a day, since chocolate is notoriously rich in unhealthy fat.

For instance, according to candy manufacturer Hershey's, a dark chocolate Mounds bar weighs 1.72 ounces and has 240 calories and 13 grams of fat, most of it saturated fat.

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## Chocolate and the Heart

### Let Dark Chocolate Be Your Valentine Small amounts do a heart good, South Beach Diet doc says

MONDAY, Feb. 13 (HealthDay News) -- Arthur Agatston, the Miami cardiologist who created the popular low-carb South Beach Diet, is no stranger to chocolate.

'I've always been a chocoholic,' he said, admitting to a special craving for chocolate-covered macadamia nuts that 'call to him' from airport kiosks whenever he's traveling.

So when it comes to Valentine's Day, Agatston is especially eager to help the diet-conscious enjoy treats in the healthiest way possible. That could mean savoring a bit of dark chocolate this Valentine's Day.

Of course, 'you can run into trouble with too much chocolate,' he said. But he noted there's been a steady stream of good data on the health effects of dark -- but not milk -- chocolate. Some research even suggests that a moderate amount of the dark delight could be good for your heart.

According to the diet doc, studies show that high concentrations of cocoa found in dark chocolate -- at least 70 percent -- help improve vascular function by relaxing blood vessels, keeping cholesterol from gathering in blood vessels and reducing the risk of blood clots.

Others agreed. Jeffrey Blumberg, a professor of nutrition at Tufts University's Friedman School of Nutrition, in Boston, said dark chocolate contains flavanols, plant-based antioxidants that may have beneficial effects on cardiovascular function. These benefits might extend to improving heart function and lowering blood pressure, he said.

'Dark chocolate, green tea and red wine have these flavanols in concentrated forms, which increases their potency per serving,' Blumberg added.

'Flavanol compounds are only present in dark chocolate,' he stressed. 'They are much more diluted in milk chocolate, which is highly processed, and white chocolate has no flavanols.'

'However, even if you're eating 80 percent cocoa, flavanol-rich dark chocolate, you're still eating a high-calorie, high-fat food,' the Boston expert warned. 'It is *not* a 'health food.'"

Nevertheless, he and a team of researchers published a study last August in *Hypertension* that found that eating a dark chocolate candy bar once a day for 15 days significantly lowered the blood pressure of 20 people suffering from hypertension.

There was a catch: The participants had to lower their caloric intake of other foods to accommodate the nearly 500 calories they consumed every day by eating the candy bar.

Another study, published online in January in the *Proceedings of the National Academy of Sciences*, identified epicatechin as the cocoa flavanol particularly associated with improved circulation and other aspects of heart health.

Agatston said Valentine's Day presents dieters with the same decisions they make every day: how to make the healthiest choices you can when sitting down to eat.

'You choose whole grain bread instead of white bread, sweet potatoes instead of white potatoes, and when it comes to Valentine's Day, choose dark chocolate-covered almonds rather than milk chocolate or white chocolate,' Agatston said. Why almonds? Because they're a good source of vitamin E. Go for walnuts, too, since they're rich in heart-healthy omega 3 fatty acids.

'You want to make the best choices, even when you're cheating a bit,' Agatston advised. Other sweet recommendations include strawberries dipped in dark chocolate, or any dark chocolate bar with at least 70 percent cocoa. Look especially for European chocolates, since they tend to be very rich in cocoa, a fact that's often listed on the label.

And what about those macadamia nuts?

'Have them in moderation, because they have good fats, but you can certainly have too many,' Agatston said.

And he should know.

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## Chocolate and the Heart

### A Bite of Chocolate a Day May Keep Blood Pressure at Bay; Limited amounts of dark chocolate lower blood pressure, German researchers report

TUESDAY, July 3 (HealthDay News) -- Chocolate lovers can rejoice again: More research has found that the antioxidants in dark chocolate can help slightly lower blood pressure.

But the good news comes with a caveat -- the chocolate portions have to be limited to 30 calories a day, which works out to slightly more than one Hershey's Kiss.

Such small amounts of the flavanol-rich cocoa found in dark chocolate 'may be a promising behavioral approach to lower blood pressure in individuals with above-optimal blood pressure,' the German researchers reported in their study.

Unlimited quantities of chocolate won't work, they added, because 'the potential blood pressure reduction contributed by the flavanols could be offset by the high sugar, fat and calorie intake with the cocoa products.'

The current study, published in the July 4 issue of the *Journal of the American Medical Association*, included 44 adults between the ages of 56 and 73 who either had blood pressure levels in the upper range of normal (considered prehypertension) or they had stage 1 high blood pressure.

None of the study volunteers had other risk factors for heart disease, which means they weren't overweight, didn't smoke, didn't have diabetes or high cholesterol or kidney disease. Additionally, the study participants didn't take additional vitamins or supplements, and the only cocoa-containing products they consumed during the study period were those provided by the researchers.

For 18 weeks, half of the group was asked to consume 30 calories a day of dark chocolate containing polyphenols (a type of antioxidant), while the other half was given 30 calories a day of white chocolate, which has nearly all of the same ingredients as the dark chocolate but no polyphenols.

By the end of the study, the average systolic blood pressure (the top number, which measures the force of blood coming from the heart) dropped by 2.9 mm Hg and the average diastolic blood pressure (the bottom number, which measures the force of blood returning to the heart) dropped by 1.9 mm Hg in the dark chocolate group. There was no change in blood pressure for the white chocolate group.

'Although the magnitude of the BP reduction was small, the effects are clinically noteworthy. On a population basis, it has been estimated that a 3-mm/Hg reduction in systolic BP would reduce the relative risk of stroke mortality by 8 percent, of coronary artery disease mortality by 5 percent, and of all-cause mortality by 4 percent,' the authors reported in a prepared statement.

The research was led by Dr. Dirk Taubert, of University Hospital of Cologne, who has done previous research on the effects of cocoa on high blood pressure.

The authors suspect that dark chocolate may increase levels of nitric oxide, a compound that helps to relax and open the blood vessels.

An American nutrition expert found the results promising.

'If you're someone with marginal high blood pressure, and if you eat chocolate anyway, switching to a small piece of dark chocolate daily may give you some benefit. It lowered the upper number about 3 points,' said Jo Ann Carson, a professor of clinical nutrition at University of Texas Southwestern Medical Center at Dallas.

Carson recommended looking for dark chocolate that has cocoa content higher than 50 percent. She also pointed out that people who are sensitive to caffeine's effects should be careful about consuming dark chocolate, because the caffeine content is higher than in milk chocolate.

'Dark chocolate doesn't give you as much caffeine as a cup of coffee, but if you start eating it in the evening, you might notice the caffeine,' she said.

Additionally, if you have underlying health problems, this study's results probably don't apply to you, according to nutritionist Angela Kurtz, from New York University Medical Center.

'This study was designed to look at the effects of chocolate in individuals who didn't have severe hypertension or other medical problems, and they weren't overweight. If you're diabetic or you have kidney disease, you cannot add chocolate to your diet,' she said.

'Moderation is the key. As long as you can have good control of your eating habits, and you can balance chocolate consumption with physical activity to offset the calories, then you can enjoy it,' Kurtz added.

But she also cautioned that 'chocolate is not a magic bullet but is one little tool for people who are relatively healthy.'

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## Chocolate and the Heart

### **Dark Chocolate May Lighten the Load on Arteries Flavonoids in the sweet treat can make vessels more flexible, study suggests**

SUNDAY, March 25 (HealthDay News) -- Delicious nibbles of dark chocolate may also boost the function of vital endothelial cells that line the inside of blood vessels, a new U.S. study suggests.

Cocoa is rich in a group of antioxidant compounds called flavonoids, which are also found in fruits and vegetables, wine and green tea. Research suggests that consumption of foods rich in flavonoids may decrease the risk of cardiovascular disease.

The study, conducted by researchers at the Yale Prevention Research Center in Connecticut, included 45 healthy people with a body mass index (BMI) between 25 and 35 kg/m<sup>2</sup>. The participants were divided into three groups that ate either eight ounces of cocoa without sugar; cocoa with sugar; or a placebo.

BMI is a measure of body fat based on height and weight. A BMI reading of 25-29.9 is an indicator of overweight, while a reading of 30 or more indicates obesity.

For six weeks, the participants underwent endothelial function testing. This was done by using high frequency ultrasound to measure the ability of the brachial artery (which runs from the shoulder to the elbow) to relax and expand in order to accommodate increased blood flow -- a test called flow mediated dilation (FMD).

The study found that FMD improved significantly (2.4 percent) in the group that consumed cocoa with no sugar, compared with 1.5 percent in the group that ate cocoa with sugar. There was a 0.8 percent decrease in FMD in the group that ate the placebo.

'In this group of healthy adults with BMI between 25 and 35 kg/m<sup>2</sup>, dark chocolate ingestion over a short period of time was shown to significantly improve endothelial function, leading our team to believe that greater benefit may be seen through a long-term, randomized clinical trial,' co-investigator Dr. Valentine Yanchou Njike said in a prepared statement.

'While the findings from this study do not suggest that people should start eating more chocolate as part of their daily routine, it does suggest that we pay more attention to how dark chocolate and other flavonoid-rich foods might offer cardiovascular benefits,' Njike said.

The study was expected to be presented March 27 at the American College of Cardiology's Annual Scientific Session in New Orleans.

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## Chocolate and the Heart

### Dark Chocolate Helps Keep Blood-Clotting Dangers at Bay More sweet news for those who love the antioxidant-rich candy

TUESDAY, Nov. 14 (HealthDay News) -- People who couldn't stomach a medical study requiring them to give up chocolate ended up helping science, anyway.

These chocoholics' blood platelets displayed a reduced tendency to clot together in dangerous clumps, researchers found.

Billed as the 'first biochemical analysis' on the subject, the finding may explain why chocolate can be good for the heart.

'Chocolate that's flavonoid-rich, that's dark, that's good quality, that's not traveling with all of its bad friends like sugar and fat, probably has some fairly potent pro-health benefits, although not as strong as aspirin,' said lead researcher Diane Becker, professor of medicine at Johns Hopkins University School of Medicine in Baltimore.

Her belief: 'Not all chocolate is bad.'

Becker presented the findings Tuesday at the annual meeting of the American Heart Association, in Chicago.

Another expert cautioned that chocolate is just one sweet piece of the dietary puzzle, however.

The study is 'interesting and in the right direction but the overall diet is what people ought to be concerned about,' said Dr. Robert H. Eckel, professor of medicine at the University of Colorado School of Medicine in Denver and past president of the AHA. He was not involved in this research.

Previous laboratory research had already shown this effect with large quantities of dark chocolate, which has high levels of antioxidants called flavonoids.

'The quantities were far more than anyone would ever eat and the measurements were done only two to four hours after the people consumed it,' Becker, a self-professed chocoholic, explained. 'We didn't know about chocolate consumption the way people really eat it.'

The 139 individuals participating in this 'offshoot' study had already been disqualified from a larger study examining the effects of aspirin on blood platelets. All had a family history of premature coronary heart disease, putting them at higher risk for heart disease.

Participants were instructed to follow a strict exercise regimen and to refrain from smoking or consuming food or drinks known to affect the activity of blood platelets, which are key to clotting. In addition to coffee, tea and other caffeinated drinks, this meant chocolate.

The 'chocolate offenders' admitted to eating chocolate on the sly, however. Rather than just disqualifying them, the study authors decided to use their cheating ways for an additional analysis. Becker and her team tested platelet samples from the 'offenders' and from a control group to see how long it took for platelets to clump together.

Chocolate appeared to slow clotting. On average, platelets in the chocoholics took 130 seconds to stick together, and in the control group about 123 seconds.

A test of urine for the waste products of platelet activity found that chocolate eaters also had less activity and produced fewer waste products.

'People who ate chocolate had markedly lower amounts of urinary excretion of this byproduct of platelet activity, which meant that the platelets are not being activated and not clumping so much in the body,' Becker said. 'The magnitude of the difference is very significant.'

'What you eat in everyday life in relatively small quantities, as long ago as 12 hours, affects platelet function -- which is kind of a way to express the amount of time it takes for blood to clot,' she continued. 'It makes blood less sticky and less likely to clot and less likely to be part of a process that could cause a heart attack.'

The bottom line? A little high-quality chocolate once in a while probably won't kill you. But follow nutritionists' advice, too -- don't ingest pounds of the stuff because the sugar and fat *may* kill you.

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## Chocolate and the Heart

# Dark Chocolate, But Not Tea, Takes a Bite Out of Blood Pressure Variety of studies supports both notions

MONDAY, April 9 (HealthDay News) -- Cocoa-rich products such as dark chocolate may help lower high blood pressure, but tea won't do much, according to a new survey of the medical literature by German researchers.

Although the thought of chocolate as a health food has captured public attention, not much research on the issue has been done, said a team from the University Hospital of Cologne.

Their report covered exactly 10 studies on cocoa with a total of 173 participants and five tea studies with 343 participants.

The benefits are believed to come from compounds known as polyphenols (or flavonoids), explained Dr. Dirk Taubert, senior lecturer in pharmacology and toxicology at Cologne and lead author of the report.

He leavened his support of chocolate with a bit of caution.

'Based on our analysis, regular consumption of polyphenol-rich cocoa products like dark chocolate may be considered a part of a blood pressure-lowering diet, provided there is no total gain in calorie intake,' Taubert said. 'However, in the studies we reviewed, the blood pressure results occurred with cocoa doses above the habitual intake and were observed only in the setting of short-term interventions.'

In other words, for the average chocolate nibbler, the jury is still out on the sweet's health effects, Taubert said. 'To date, it is not known whether long-term intake of small habitual amounts of cocoa, such as a small bar or piece of chocolate per day, may also cause significant blood pressure effects,' he said.

The cocoa studies lasted an average of two weeks, with four out of five trials reporting a reduction in both systolic blood pressure (the top number in a blood pressure reading, when the heart contracts) and diastolic number, when the heart relaxes.

The average reduction was 4 to 5 millimeters of mercury (mm/Hg) in systolic pressure and 2 to 3 millimeters in diastolic pressure -- enough to reduce the risk of stroke by 20 percent and of coronary heart disease by 10 percent.

No such reduction in blood pressure was noted in any of the tea trials, which lasted an average of four weeks.

Tea and cocoa contain different kinds of polyphenols -- flavan-3-ols in tea, procyanids in cocoa, the researchers said.

'We do not know exactly which are the active blood pressure-lowering ingredients in cocoa,' Taubert said. 'There is evidence that the cocoa polyphenols are responsible, but there are several hundreds of phenols in cocoa.'

Whichever are responsible, studies of cell cultures in his laboratory have also suggested that polyphenols can stop the oxidation of beta-amyloid protein, the process that leads to formation of plaque in the brains of Alzheimer's disease patients, said Chang Y. Lee, chairman of the department of food science and technology at Cornell University in Ithaca, N.Y.

In addition, 'reports from many laboratories clearly show that the ingestion of flavonoid-rich foods enhance circulation,' Lee said.

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## **Chocolate and the Heart**

Much remains to be learned, Lee added. 'Many people have been talking about different kinds of flavonoids,' he said. But we do not know exactly how much of these compounds are absorbed in the body and also when they are absorbed, how much is distributed to different sites.'

Lee said he can 'happily recommend' the occasional cup of cocoa. 'But I am cautious about people taking chocolate milk, because it is high in sugar and high in fat,' he said. 'Dark chocolate may be all right, but I do not recommend cocoa preparations that contain high sugar.'

Drug treatment is the basis of blood pressure control, Taubert said, and it should always be accompanied by lifestyle measures such as exercise and proper diet. 'Rationally applied, cocoa products may be part of such an antihypertensive diet,' he said.

## Chocolate and the Heart

### Chocolate Does a Man's Heart Good

#### Dark variety seems to lower older men's risk of death, study finds

MONDAY, Feb. 27 (HealthDay News) -- Chocolate lovers, take heart: Dutch research suggests that eating or drinking cocoa appears to lower blood pressure and even reduce the death risks for older men.

Since the 1700s, cocoa has been associated with healthy hearts, but only recently has scientific evidence backed up these claims, according to a new report in the Feb. 27 issue of the *Archives of Internal Medicine*.

According to the study, cocoa contains flavan-3-ols, which have been linked to lower blood pressure and improved function of the cells lining the blood vessels.

In their study, researchers led by Brian Buijsse, of the National Institute for Public Health and the Environment, in Bilthoven, examined links between cocoa and cardiovascular health in 470 men aged 65 to 84 years. The men had physical examinations and were interviewed about their diet at the start of the study in 1985 and then again in 1990 and 1995.

The researchers found that over a 15-year period, men who ate cocoa -- including chocolate -- regularly had significantly lower blood pressure compared with those who didn't.

The sweet treat might even help ward off death. The researchers reported that 314 men died over the course of the study, with 152 of those deaths blamed on heart disease. Men who consumed the highest amount of cocoa were half as likely to die from cardiovascular disease, compared to men who ate little or no cocoa, the team found. In addition, men who ate the most cocoa were less likely to die from any causes.

For these men, the risk remained low even after taking into account other factors, such as weight, smoking, physical activity, calorie intake and drinking alcohol, the researchers found.

The researchers believe that the lowered death risk didn't stem so much from lowered blood pressure, as from other heart-healthy benefits linked to flavan-3-ols. And since cocoa is rich in antioxidants, it may also protect against other diseases linked to oxidative stress, such as chronic obstructive pulmonary disease, and certain types of cancer, the researchers speculated.

One expert said the study helps confirm the use of cocoa as part of a healthful diet.

'Cocoa is the most concentrated source of bioflavonoid antioxidants readily available in our diets,' said Dr. David L. Katz, an associate professor of public health, and director of the Prevention Research Center at Yale University School of Medicine.

'An accumulating body of evidence suggests that this translates into health benefits for those who consume cocoa or dark chocolate with a cocoa content of 60 percent or more. Benefits have been seen in endothelial function, a measure of blood vessel health, blood pressure, insulin levels, and serum lipids,' added Katz, author of *The Flavor Point Diet*.

The evidence is now very consistent that cocoa has health-promoting effects, Katz said.

'However, it is almost certainly dose-dependent,' he added, cautioning that there's a calorie-rich downside to excessive cocoa consumption. 'Cocoa comes in foods that tend to be energy-dense, and the harm of excess calories could readily offset the benefit of antioxidants.'

And he stressed that cocoa's heart-healthy benefits only come from bittersweet dark chocolate and in concentrated cocoa beverages, which contain an effective dose of antioxidants, along with magnesium, arginine and fiber.

'This is not the case for milk chocolate, which contains potentially harmful saturated fats, or candy bars that dilute cocoa with a long list of other ingredients,' Katz said.

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### The Prostacyclin Effect

There's another reason to be excited about chocolate's heart-healthy properties. It appears that cocoa may positively affect the production and behavior of prostacyclins, according to Dr. Carl Keen, from the University of California-Davis, who has thoroughly studied the bioactivity of chocolate. Produced in the body, prostacyclins inhibit platelet clotting, reduce the risk of thrombosis and blood vessel constriction, and prevent the oxidation of LDL (the "bad" cholesterol) and its entry into the blood vessel walls, where it can result in inflammation. Prostacyclins also lower the activity of cytokines, agents that contribute to unwanted chronic inflammation. Additionally, prostacyclins activate the production of nitric oxide, allowing blood vessels to expand and become more flexible. Prostacyclins also appear to inhibit the activity of lipoxygenase, an enzyme that plays a pivotal role in the inflammation process. Stopping this inflammatory response reduces blood vessel damage.

### Nitric Oxide (NO) Necessary for a Healthy Heart

Numerous studies tell us that damage to the lining, or endothelium, of the blood vessel walls is a major factor in the progression of CVD and eventually heart attack, stroke and other coronary events. We also know that a healthy endothelium depends on nitric oxide (NO). Nitric oxide has risen to the status of chemical superstar in recent years, as American researchers won the Nobel Prize in 1998 for their work involving NO. Other research on cocoa and its components suggest that chocolate-based foods may positively affect the body's production and use of NO. Consequently, we know that nitric oxide is crucial to the health of the endothelium and cardiovascular system in general, because it does the following:

- It allows blood vessels to dilate, or become more relaxed. This means that the blood vessels can expand when necessary, reducing the risk of a number of health conditions.
- It reduces the clotting action of red blood platelets, which decreases risk of stroke and related conditions.
- It inhibits the production of smooth-muscle cells in the vascular system and smooth-muscle contractions.
- It stops LDL-C oxidation.
- It stops the expression or action of cell-adhesion molecules.
- It slows the recruitment of the pro-inflammatory leukocytes to a particular area.
- It reduces oxidative stress in the vascular system by inactivating superoxide anion, a potent free radical.

## Chocolate and the Heart

# A Happy Healthy Heart How Chocolate can Help

Imagine asking a hundred people on the street which disease is today's No. 1 killer – what do you think they would answer? “Cancer” would be the most likely result. To the surprise of most people, it's not cancer that kills more Americans than any other disease. The correct answer is cardiovascular disease (CVD) – commonly known as heart disease – and it's not only tops among men, it's also No. 1 among women.

Heart disease accounts for one in every three deaths of Americans annually. And while we hear plenty about new advances in surgery and medications to treat problems of the heart, far too little emphasis is placed on preventing and controlling heart disease through diet and other lifestyle measures.

Over the last couple decades, we've been flooded with information counseling us to avoid cholesterol and certain kinds of fats in our diets. But new research is emerging, helping paint a clearer picture of the factors that contribute to the various forms of today's top fatal diseases.

While science and medicine continue their push for improved drugs and other therapies to treat heart disease, natural supplements can aid in preventing and reversing cardiovascular problems. Surprisingly, one of these is dark chocolate, which is becoming increasingly popular as a supplement in the United States and elsewhere. It's now quite clear that chocolate contains a variety of antioxidants other nutrients that may fight the effects cardiovascular disease.

### Heart Disease: The Beginning

Why does heart disease occur? It's a good question, and typically requires a fairly complex -answer. Heart disease doesn't just happen overnight. It usually takes years to develop, and is largely a result of lifestyle habits. We all start out with a very clean heart and blood vessels, which bring nutrients to the heart muscles. But, over time, several factors begin to affect our cardiovascular system and increase our risk of developing symptoms of CVD and stroke.

These factors include:

- Diet
- Gender
- Inactivity
- Obesity
- Alcohol or tobacco use
- High cholesterol levels
- Low blood pressure
- Diabetes

### Inflammation: Fueling the Fire of Cardiovascular Disease

In addition, the science and health worlds are recognizing the critical role that inflammation – especially chronic inflammation – plays in the onset of CVD.

Generally, inflammation is the body's response to injury, which may come in various forms. Bacterial or viral infection, environmental toxins, a high-fat diet, smoking and alcohol are some of the primary causes. The inflammatory process causes a sequence of actions in the heart and vascular system, namely the buildup of plaque, which if allowed to progress will lead to problems ranging from angina and high blood pressure to stroke and heart attack.

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## **Chocolate and the Heart**

Often, inflammation is at the core of a cycle leading to cardiovascular disease. It usually begins because of a combination of unhealthy diet, lack of exercise and other factors. Imagine the unhealthy fats, high blood-sugar levels and chemicals common to the American diet coursing through a person's veins. They irritate the blood vessel walls, leading to a mild state of inflammation, calling the body's attention to an "injury."

This low-grade inflammation makes the vessels susceptible to particles of bad cholesterol, or LDL cholesterol. The LDL particles are ingested by macrophages, whose role is to eliminate pathogens, toxins and other dangerous cells. But, if the exposure to these particles is lengthy, the macrophages begin to swell and eventually turn into fat-laden "foam cells" that enmesh themselves in the blood vessel walls.

To eliminate these foam cells, the body sends helper cells, or T cells. The only problem with this is that T cells also contribute to more inflammation (normally a necessary thing.) In this case, however, inflammation is the last thing the blood vessel needs, and the result is a continuous cycle of unhealthy fats attaching to the blood vessel wall.

At first, the damage is minor and takes the form of fatty streaks or plaques. But, as the body tries to cope with the disease, it begins to place a fibrous covering over the plaque, which results in hardening of the arteries. This can cause numerous problems. The plaques can get so big they stop blood flow. In addition, the plaques rupture, causing blood clots, which can cause a heart attack or stroke. Or, the hardening of the arteries leads to high blood pressure, which contributes directly to an enlarged heart, damage to organs and tissues, and congestive heart failure. With congestive heart failure, fluid builds in the lungs, liver and lower legs, the heart bogs down and cannot pump efficiently, which ultimately leads to death. Hardening of the blood vessels also contributes to dementia, kidney failure, blindness and skin ulcers.

Studies now confirm the notion that inflammation can play an important role in triggering a heart attack. This may explain why those with normal cholesterol levels may still have a heart attack. "The implications of this are enormous," says Dr. Paul Ridker of Boston's Brigham and Women's Hospital in a 2002 Associated Press article. "It means we have an entire other way of treating, targeting and preventing heart disease that was essentially missed because of our focus solely on cholesterol."

For many experts, the unearthing of chronic inflammation's ill effects on the cardiovascular system means a top-to-bottom rethinking of the origins and prevention of heart trouble. It's a revolutionary departure from viewing the world's top killer as largely a plumbing problem blamed on cholesterol-clogged arteries, the standard theory throughout modern cardiology.

Consequently, a growing number of cardiologists are calling for routine screening for chronic inflammation by testing for C-reactive protein – a substance in the blood that is a marker for inflammation. An elevated level of C-reactive protein raises red flags for cardiovascular health.

The shift in how the medical world views heart disease could be dramatic. Dr. Eric Topol, Department Chairman of the Cleveland Clinic Heart Center, recently stated that the emerging data about inflammation will, "change everything we do in heart disease." He adds that, in the past, the focus was on the danger of high cholesterol. Now doctors will talk to their patients about the risks of high C-reactive protein levels.

## **The Threat of Free Radicals**

It doesn't matter how healthy we are or what kind of environment we live in, our bodies are exposed daily to a cellular process called oxidation. The same oxygen we breathe also puts our cells at continuous risk because of oxidation, the same process that causes metal to rust, fats to go rancid and fruit to turn brown.

In the human body, oxidation also causes damage to healthy human tissues on a cellular

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## Chocolate and the Heart

level. Over time, this damage results in what we generally call aging and it can put our health at risk. Free radicals, or oxidants, are a natural by-product of cellular metabolism, a beneficial bodily process needed, among other things, to fight infections, convert glucose into energy and build muscle mass.

These natural by-products – free radicals are unstable and highly reactive in the body. In simple terms, free radicals are unstable molecules because they lack an electron and are constantly scavenging healthy cells for replacement electron. Experts estimate that every cell experiences 10,000 free radical attacks each hour of every day.

If that sounds serious, it is. Unless the scavengers are neutralized, they may succeed in stealing electrons from healthy human cells, leaving those cells damaged and unstable – creating a chain reaction of dangerous cell mutations. DNA damaged by free radicals can cause cells to replicate incorrectly (or not at all), interfering with proper cell function and often resulting in cell death. Over time, these mutations cause aging and may lead to cancer and other forms of chronic disease. It has been estimated that more than 200 diseases are associated with free-radical damage and oxidative stress.

We can receive protection from the oxidative and carcinogenic effects of free radicals in the form of antioxidants – compounds found in various natural food sources, typically plants. Antioxidants work on a cellular level to deactivate free radicals in the body, neutralizing their effects and preventing cell damage, reducing the risk for disease and slowing the aging process.

Most of us understand that cancer is one disease associated with abnormal cell duplication, but oxidative damage has been linked to more than 60 diseases, including cancer. These are just a few of the primary conditions linked to free-radical damage:

- Diabetes
- Heart disease
- Arthritis
- Cancer
- Cataracts
- Alzheimer's/dementia
- Multiple sclerosis
- Inflammatory bowel disease
- Lung disease
- Autoimmune dysfunction

### Chocolate's Heart-Healthy Compounds

Among the cocoa bean's most important nutrients are several classes of polyphenols, largely recognized as some of the most powerful antioxidant and anti-inflammatory compounds known today. Polyphenols are found in a variety of fruits and vegetables ranging from onions to apples, green tea, grapes and the cocoa bean. Polyphenols comprise multiple categories, including phenolic acids, simple phenols, phenylpropanoids, quinines, stilbenes, xanthenes – and the largest group – flavonoids (also called bioflavonoids). The following are just some of the known heart-healthy agents in cocoa:

- Flavones
- Flavonols
- Flavanone
- Flavanol (flavan-3-ols)
- Isoflavones

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## Chocolate and the Heart

- Anthocyanidins
- Prostacyclins
- Gallic acid
- Catechins
- Epicatechins

Flavonoids are some of the compounds that provide plants, vegetables and fruits with their color – with reds, purples and blues the most prevalent. In plants, flavonoids help provide protection from disease and ultraviolet rays. Flavonoids affect the taste, color, bitterness and other attributes of plants. Substantial evidence suggests that the darker the skin of a fruit, the more antioxidants it contains. With chocolate, the same holds true – the more bitter the cocoa, the more antioxidant compounds – like flavonoids – it contains.

In short, flavonoids are an impressive group. Abundant research demonstrates they possess anti-inflammatory, antioxidant, antibacterial, anticancer, and antiviral properties, as well as the ability to act like hormones (without the damaging side effects), protect and repair the liver, normalize blood-sugar levels, relax and dilate the blood vessels, modify blood platelet clotting, maintain mental function, lower the risk of different forms of dementia, fight cancer, prevent cavities and other forms of oral disease, and relieve allergy symptoms, among other possible benefits.

For many years, scientists have believed that green tea and red wine (or grape juice) were the food sources most rich in catechins and epicatechins, which are generating much excitement because of their apparent ability to fight cancer, regulate cholesterol and blood pressure levels, and reduce blood clotting and the risk of heart attack and stroke.

But research is proving otherwise. A recent study from researchers at Cornell University showed that dark chocolate scored higher than both green tea and red wine. “If I had made a prediction before conducting the tests, I would have picked green tea as having the most antioxidant activity,” says Chang Lee, Ph.D., who led the research efforts. “When we compared one serving of each beverage, the cocoa turned out to be the highest in antioxidant activity, and that was surprising to me.”

The tests showed the chocolate-based drink measured significantly higher than green tea and red wine in catechin and gallic acid content, both known for their antioxidant capabilities. Epidemiological studies focusing on green tea consumption (and thereby catechin consumption) aren't yet conclusive, but early results suggest those who drink green tea live longer than those who don't.

Of course, there are many other classes of polyphenols and phytonutrients, some of which are found in chocolate. While there's still much research to be done, that which is already completed paints a very positive and promising picture of the health benefits of these amazing compounds.

### The Research Behind Chocolate

Dozens of studies suggest the ability of dark chocolate to protect the heart in a variety of ways, including fighting the previously explained inflammation and oxidative damage, improving blood platelet function, decreasing the clotting of blood, and allowing blood vessels to relax and become more pliable, which lowers blood pressure. In addition to those studies discussed elsewhere in this article, the following are highlights of other important findings.

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## **Chocolate and the Heart**

### **Study No. 1**

To further assess the various claims regarding the ability of chocolate to fight CVD, a team of scientists from the Harvard School of Public Health reviewed 136 studies of the relationship of chocolate and cocoa to cardio vascular health. The review included all types of research from lab tests to human studies. The research team concluded that chocolate is a major source of flavonoids (epicatechins, catechins and procyanidins) and found that the principal fat in chocolate – stearic acid – did not have adverse effects on blood vessels, cholesterol levels or overall CV health, because it's metabolized differently than other saturated fats.

The review also confirmed the finding of many studies that suggested regular chocolate intake can potentially protect the heart and vascular system in a variety of ways. These include lower blood pressure, decreased inflammation in blood vessels, decreased blood clotting, increased levels high-density lipids (HDL – the good cholesterol) and decreased oxidation of low-density lipids (LDL), improved endothelial function (increased nitric oxide production), inhibition of leukotriene activity (which causes the constriction of blood vessels and contributes chronic inflammation), and increased activity of prostacyclins, which help blood vessels relax and reduce blood platelets from forming clots. Pretty impressive stuff.

### **Study No. 2**

A February 2006 study published in the *Archives of Internal Medicine* presented new data on cocoa intake and heart disease from older men. A Dutch research team followed 470 men aged 65 to 84 for more than 15 years. Food histories were taken and subjects divided into three groups by daily cocoa intake – none, low or high. The high cocoa intake was equivalent to eating about 10 grams of a standard dark chocolate daily. The results were very promising, with the high-cocoa group demonstrating slightly lower blood pressure and a 45 to 50 percent lower rate of death from cardiovascular disease.

Because the difference in blood pressure was relatively small, the researchers concluded that the decrease in risk of CVD must be explained by other possible benefits of chocolate consumption, such as improvements in the function of blood vessels, lower blood-glucose levels, decreased platelet clotting, improved cholesterol levels, protection of blood lipids against oxidation, and reduced activity of inflammatory components such as cytokines.

“The key message is that our study suggests that using low amounts of cocoa foods on a daily basis, equal to about 10 grams of dark chocolate, may lower blood pressure and CVD [cardiovascular] death,” says lead researcher Brian Buijsse, M.Sc.

The study's authors concluded this long-term review supports the findings of various short-term studies indicating chocolate take can improve cardiovascular health d lower the risk of cardiovascular disease.

### **Study No. 3**

Research completed by a team from the University of California-Davis and Tufts University, and published in a 2005 issue of *The American Journal of Clinical Nutrition*, found the proanthocyanin and flavanol content of cocoa demonstrated significant antioxidant properties and the ability to protect the heart and vascular system. “These nutrients been shown to affect numerous intracellular signaling cascades, and to influence the cardiovascular system by enhancing vascular function and decreasing platelet activity,” states lead researcher Dr. Carl Keen.

The researchers discovered the epicatechin content of dark chocolate is likely responsible for the improved relaxation of blood vessels by enhancing the function of the blood vessels'

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## Chocolate and the Heart

endothelial lining. It's also important to note that the patients' blood levels of lipids did not increase during the trial. Additional review of research, which was compiled by some of the same researchers, suggests that flavonoids from chocolate have an anti-inflammatory effect by controlling the activation of several pro-inflammatory agents in the body.

### Study No. 4

A 2006 study completed by a team of researchers from the University of California-Davis and the University of Dusseldorf in Germany ascertained the compound epicatechin found in cocoa is directly linked to improved circulation and other hallmarks of cardiovascular function. State the researchers, "The results of the study provide direct proof that epicatechin is, at least in part, responsible for the beneficial vascular effects observed after the consumption of certain flavanol-rich cocoa [foods]." The researchers also explained that the relaxation response observed in the blood vessels of the subjects was mediated by nitric oxide (NO), a key signal released by the inner lining of blood vessels (the endothelium).

Crucial to the study were volunteers from a Panamanian group of Indians called the Kuna. High blood pressure and other signs of cardiovascular disease are rare among the island-dwelling Kuna, who are also known to consume large amounts of chocolate (usually in the form of a hot beverage, about three to four cups a day). Previous studies have shown that Kuna who have migrated to urban environments, and consequently consume less cocoa, do not enjoy the same level of cardiovascular health. Upon returning to a regular intake of the cocoa beverage, the researchers found that the risk factors for CVD and related problems were reduced significantly.

### Study No. 5

Famed sisters and colleagues Mary and Marguerite Engler recently completed a study that shed light on exactly how chocolate and its key ingredients improve the health of the endothelial lining of blood vessels. In the study, 21 subjects were given either high-flavonoid, dark-chocolate bars or low-flavonoid chocolate bars every day. After two weeks, the subjects were tested for changes in their endothelial function, blood pressure, blood-lipid profile and blood-epicatechin concentrations.

The results were impressive, indicating the endothelial function of those eating the high-flavonoid chocolate was significantly higher than those eating the low-flavonoid chocolate. In addition, the blood-epicatechin concentrations of the high-flavonoid group were also significantly higher than the low-flavonoid group. These results led the researchers to state that consumption of flavonoid-rich dark chocolate improves the function and health of the blood vessel wall (endothelium), which plays a pivotal role in the overall health of the heart and cardiovascular system, and may provide other cardio-protective benefits because of the increased catechin concentrations.

In addition, a review conducted by the Engler sisters supported these findings. In the review, they suggest that possible benefits of consumption of cocoa flavonoids include protecting the entire cardiovascular system, optimizing nitric oxide production and increased antioxidant activity. They suggest that regular consumption of flavonoids can prevent the oxidative stress brought about by the various common risk factors. **BIH**