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Chocolate: Good for the Mind, Body & Spirit

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It has been shown as proof positive that carefully prepared chocolate is as healthful a food as it is pleasant; that it is nourishing and easily digested...that it is above all helpful to people who must do a great deal of mental work...~Anthelme Brillat-Savarin

Any true chocolate connoisseur can tell you that this delectable "food of the gods" is good for your mind and your spirit. Researchers—nutritionists, food scientists, nurses and cardiologists—have also demonstrated scientifically that chocolate is good for your body.

Knowledge of chocolate's benefits is not new. The ancient Aztecs discovered a "divine drink, which builds up resistance and fights fatigue." A cup of this invaluable, refreshing and nourishing drink, made by crushing the seeds of the Theobroma cacao tree, permitted a man to walk for a whole day without food. Nutrition researcher, Michael Levine, among others, described chocolate as being the world's perfect food—chemically speaking. (1,2)

Effects on the Mind

Noted sex therapist Dr. Ruth Westheimer says of this "wicked pleasure" that "the taste of chocolate is a sensual pleasure in itself, existing in the same world as sex." The reason? Chocolate stimulates the release of endorphins, natural hormones produced by the brain, that generates feelings of pleasure and promotes a sense of well being. Chocolate may also make a person feel better by directly interacting with the brain. One of the ingredients in chocolate is tryptophan, an essential amino acid needed by the brain to produce serotonin. Serotonin is a mood-modulating neurotransmitter, the brain's "happy chemical." High levels of serotonin can give rise to feelings of happiness. (1,3)

Chocolate contains another neurotransmitter, anandamide. Anadamine targets the same brain structure as THC (tetrahydrocannabinol), the active ingredient in cannabis. Chocolate also contains two chemicals that slow the normal breakdown of anandamide and prolong the action of this natural stimulant in the brain. The BBC's Hot Topic article on Chocolate provides an excellent Flash animation demonstrating how chocolate might prolong the effects of anadamine. (1) However, one must note that experts estimate the levels of these substances are so low in most chocolate, that a person would need to eat several pounds of chocolate in order to substantially impact the brain's own normal anandamide levels. (1,3)

Many people consume chocolate during moments of emotional distress, for its comforting properties, ability to improve mood and restore a sense of well being. The comforting, mood-elevating properties are most likely caused by the release of

endorphins resulting from chocolate consumption. (3)

Effects on the Body & Heart

Chocolate is a perfect food, as wholesome as it is delicious, a beneficent restorer of exhausted power....~ Baron Justus von Liebig

The heart-protecting properties of dark chocolate have been recognized for some time. Numerous dietary intervention studies have demonstrated cardioprotective effects of flavanol-rich foods and beverages. Black tea, green tea, red wine, various fruits and berries, cocoa and cocoa products all contain high concentrations of flavonoids, phenolic phytochemicals, which have been extensively investigated for their chemopreventive and antioxidant capacities. (4,5) Flavonoids appear to exert their cardioprotective effects by defending against oxidation, improving endothelial function, reducing the tendency of blood to clot by improving platelet function and decreasing hypertension and reducing the risk of heart disease. (4-8) Research by Lee et al, suggested that cocoa may have more benefits than teas and red wine because of greater amounts phenolic phytochemicals and a higher antioxidant capacity. (6)

Endothelial dysfunction appears to play a key role in the pathogenesis of atherosclerosis, coronary artery disease, diabetes mellitus and hypertension. (The endothelium is the thin layer that covers the inner surface of blood vessels.) Recent evidence has shown that flavanol-rich cocoa induces vasodilation by activating the nitric oxide system, enhancing nitric oxide synthesis, improving endothelial function and increasing blood flow in the arteries. (4,7,8) Enhanced endothelial function and the ability of the artery to dilate improves vascular health and subsequently lowers the risk for heart disease. (9) Flavonoids appear to decrease the tendency for blood to clot and reduce the risk of forming blood clots, by reducing platelet aggregation and activation. (8,10)

Components in chocolate may aid in decreasing hypertension. In 2003 Taubert et al reported significant decrease in both systolic and diastolic blood pressure in elderly patients who consumed dark chocolate. (11) The elderly participants with isolated systolic hypertension were asked to consume 100 grams (3.5 ounces) of dark chocolate over a period of two weeks. Eating chocolate was found to decrease the systolic blood pressure by an average of 5.1 mmHg, indicating that the cocoa component of dark chocolate was responsible for the lowering blood pressure. (11, 12)

In addition to the cardiovascular protective effects of chocolate, cocoa contributes various minerals—magnesium, phosphorus and potassium—needed for the optimum function of the body's various systems. Quality dark chocolate and cocoa powders contain high amounts of the mineral magnesium. A bar of chocolate can provide 25 – 50 mg of magnesium. Premenstrual women often crave chocolate. This increased chocolate craving may be an attempt by the body to self-medicate, restore magnesium dietary deficiencies by eating chocolate and increasing the intake of this mineral. (3,13) Additionally, magnesium is needed in many of the

reactions involved in metabolism, so eating chocolate may provide minerals that help the body more efficiently metabolize food into energy.

Thus, multiple components in chocolate, particularly flavonoids, contribute to the complex interplay of nutrition and health. (8, 14) These various studies might lead one to think, as did Jeremy Laurance (15) that “A square of chocolate a day could keep the cardiologist away.”

Less Healthful Effects on the Body

Most people, especially true aficionados, agree that cocoa and chocolate are delicious, delectable and desirable in whatever form, whether consumed as foods or as beverages. Evidence from many research studies (4-12) have demonstrated true benefits of cocoa—to promote vascular health and protect the heart. However, there are other factors that should be carefully considered before deciding if chocolate can become a part of a person’s diet plan, realizing that there may be better ways of improving the blood vessels (16).

Chocolate contains other components mixed with cocoa to make cocoa more palatable. These additional components contribute to less healthy attributes of chocolate products. Fat, sugar and other components provide a high number of calories and can negatively impact a person's health by increasing the risk of obesity and interfering with diabetes. (17)

When eating chocolate the number of calories provided by the food or beverage can be quite significant. In terms of calories, chocolate is much more calorie or energy dense than many other foods, packing a large number of calories into a small amount of food. Chocolate averages around 500 calories per 100 grams or 3.5 ounces. (16) In Taubert's study on the effects of chocolate on hypertension, participants consumed 14 consecutive daily doses of 100 grams of dark chocolate, increasing their calorie intake by 480 kcalories. (11) This increase in calories would translate to an excess of 3360 kcalories in a week— almost two pounds by the end of the study. In Engler's study examining the effect of dark chocolate on endothelial function, participants were asked to consume 46 grams of dark chocolate daily, the approximate amount in 10 Hershey's Chocolate Kisses, increasing their daily calorie intake by 250 kcalories. (9,18) In two weeks of consuming this amount of chocolate the participant would reach the calories needed to gain a pound of weight. Thus, the calories gained from consumption of chocolate over time can be significant, unless balanced by increased physical activity.

Another factor to consider when eating chocolate is the fat content. Fats can make up as much as 50% of the total calories in a bar of chocolate, depending on the type of chocolate and whether or not nuts are included. (19) Although the fat content of chocolate is relatively high, not all of the fat present is harmful. Cocoa butter is comprised of palmitic acid and stearic acid, both saturated fats and oleic acid, a

heart-healthy monounsaturated fat. Palmitic acid can raise blood cholesterol, but only represents a portion of the total fats in chocolate. Stearic acid and oleic acids do not raise blood cholesterol, in fact oleic acid may help in reducing blood cholesterol. (14,17-20) Dark chocolate, made with a high cocoa butter content, may help to increase levels of HDL, the good cholesterol. On the other hand chocolate made with palm, coconut or hydrogenated or partially hydrogenated oils, instead of cocoa butter is less healthy and can raise bad cholesterol levels. (8, 16)

The combination of cocoa butter (fats) and sugar in chocolate have a lower glycemic index than might be expected. Dark chocolate has a low of 22, milk chocolate 40 and 70 for chocolate bars with higher sugar content. (The glycemic index indicates how quickly the blood sugar [glucose] levels increase two to three hours after eating carbohydrates, as the carbohydrates are converted into glucose.) For those predisposed to diabetes, foods flavored with cocoa powder such as chocolate bars, cakes, breakfast cereals, ice cream and chocolate milk have much higher glycemic indexes because they are mostly sugar, increasing insulin levels after eating. Thus, high sugar content in chocolate foods and beverages not only contributes to the number of calories, but it can also pose a potential health problem, especially for those predisposed to diabetes. (20)

Types of Chocolate

"Once in a while I say, 'Go for it!' and I eat chocolate," confesses model Claudia Schiffer. Obviously, even for this supermodel, indulging in chocolate is worth the calories. However not all types of chocolate are healthy. When choosing chocolate for the health benefits consider the type of cocoa bean, the processing method used and what other ingredients have been added to the chocolate. (4,17)

The processing of cocoa causes the loss of flavanols in most commercially available cocoas and many chocolates. (4) Dutch processing is the procedure of turning roasted cocoa or cacao beans (the source of chocolate) into cocoa powder, which significantly reduces the flavonoid content in the chocolate. The three main forms of chocolate available are: (4, 21-23)

Dark, Semisweet Chocolate

Unsweetened chocolate combined with added sweeteners and cocoa butter which contain at least 35% chocolate liquor.; the fat content averages 27%. Dark chocolate has two to four times (or more) the amount of flavonoids than milk chocolate.

Milk Chocolate

-Unsweetened chocolate with added cocoa butter, milk, sweeteners and flavorings. All milk chocolate made in the U.S. contains at least 10 % cocoa mass and 12 % whole milk.

White Chocolate

Contains cocoa butter but no nonfat cocoa solids. It is the term used to describe

products made from cocoa butter, milk solids and nutritive carbohydrate sweeteners. White chocolate contains no cocoa solids or chocolate liquor, so it provides none of the health benefits from flavanoids. (22)

Consumers should also realize that, in general, none of the instant cocoa mixes or other various chocolate-flavored products contain the cardio-protective flavonoids. These mixes and products along with candy items such as chocolate covered caramel-nut chews and white chocolate are generally not considered to be the heart-healthy choices. (17) Chocolate products containing more than 70% cocoa are the most beneficial and healthy. Higher quality dark chocolate is frequently more satisfying than mass-produced milk chocolate, so that a person is able to eat chocolate in smaller portions and be content. (8) Many chocolate manufacturers now include the percentage of cocoa on the packages to make selecting a higher quality chocolate easier.

Research & Funding Sources

Researchers (7,12) have demonstrated that their findings may provide a possible mechanism for cardioprotective effects of flavanol-rich foods. However many still believe that more randomized controlled trials are needed to examine the influence of flavanols on cardiovascular events before recommending dietary supplementation with cocoa. (12)

When reading the research results touting the health benefits of chocolate, consumers should also consider the employers, funding sources and materials support for the chocolate studies and whether there might be some conflicts of interests in publishing their results. M&M/Mars Inc. (candy makers) employed one of the researchers with the Hollenger project (4). In addition two of the researchers on this project served as consultants to Mars on several occasions and also received research grant support from Mars. (4) The Keen team (5) has researchers who worked for Mars, as part of Analytical and Applied Sciences, Mars Incorporated. (1) Engler's study was funded by the UCSF School of Nursing, however, the American Cocoa Research Institute, who's members include some of the world's largest chocolate manufacturers, provided the chocolate. (9,16)

Recommendations for Choosing a Life with Chocolate

For many people chocolate remains a favorite food and beverage. Results show both positive and negative aspects about consuming chocolate. It is important to consider the various components of chocolate and the complex interplay of both nutrition and health before making a decision to include chocolate as part of a diet plan. (14)

Evaluation of the existing research is also important for healthcare practitioners trying to weigh the evidence and decide what to recommend about chocolate to patients. Eating flavanol-rich cocoa provides positive cardio-protective benefits. (1) Unfortunately, there is currently no established serving of chocolate that allows a

person to reap the reported cardiovascular benefits. (17) Chocolate also provides trace minerals used in various metabolic reactions. Over indulgence of chocolate and the accompanying calories, fat and sugar can have a negative impact on pre-existing conditions such as diabetes, overweight and obesity, which ironically increases a person's risk of heart disease. (1) In light of the current obesity epidemic and the potential for increasing the risk of heart disease, physicians and dieticians should be cautious when recommending cocoa a part of a diet to all patients. As noted by Belinda Linden of the British Heart Foundation, "We are not saying never eat chocolate-everyone enjoys a treat from time to time—but there are certainly much better ways of improving your blood vessels, such as eating a varied diet, including at least five portions of fruit and vegetables a day." (16)

Most experts agree that when enjoyed in moderation a small piece of dark chocolate (up to 2 oz. per day) can be included as part of a healthy diet for most healthy people. (24) Monica Myklebust, MD, and Jenna Wunder, MPH, RD of the University of Michigan Integrative Medicine Department included dark chocolate as a source of beneficial antioxidants when they developed their Healing Foods Pyramid in 2004. (8)

Perhaps Mary Engler PhD, RN summed up the findings about chocolate the best. "Even though we still have a long way to go before we understand all of chocolate's effects, for now, there's little doubt that in moderation and in conjunction with a healthy, balanced diet and exercise we can enjoy—and even benefit from—moderate amounts of high-flavonoid dark chocolate." (9)

Research has helped to confirm what true chocolate connoisseurs already knew: that chocolate is a healthful food. So the next time you reach for a square of dark chocolate, or prepare a cup of healthful hot chocolate for the wellness benefits you can do so with less guilt.

Choose the dark chocolate, with higher amounts of cocoa (>70 %), enjoy in moderation, but most of all savor the delicious moment. (17,18) A day without chocolate is like a day without breathing. You are simply missing one of the basic pleasures of life.

Chocolate is the best friend of those engaged in literary pursuits...—Baron Justice Von Liebig

Note: The author tested chemist Baron Justice Von Liebig's statement during the writing and editing of this article. She is now off for a brisk walk.

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