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Artificial Sweeteners

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What role does sugar play in our diet?

How many people do know who say that they have a "sweet tooth"? Ever hear someone say that they are "addicted" to sugar? Sugar and its role in our diet has, indeed, become a controversial topic. Many have blamed the rise in overweight and obesity in our country on sugar. Our intake of sugar has increased, but so has our intake of artificial sweeteners. Are either or both to blame?

There are few people who can resist the taste of sweet foods. We are born with a preference for sweets, and it remains with us throughout our lives. However, too much of a good thing can lead to problems such as dental cavities, tooth decay, obesity, and the health complications related to being overweight and obese (for example, type 2 diabetes, hypertension, hypertriglyceridemia, and heart disease). Problems such as osteoporosis and vitamin and mineral deficiencies can also occur when high-sugar foods replace more nutritionally balanced foods.

The dietary guidelines state that we are to choose beverages and foods to moderate our intake of sugars. In the United States, the number-one source of added sugars is non-diet soft drinks (soda or

pop). Other major sources are sweets and candies, cakes and cookies, and fruit drinks and fruitades. Limiting your intake of these foods and avoiding foods with high amounts of added sugars is the best way to control your intake. When reading the ingredients on a food label, you must read carefully. Ingredients are listed in order of the amount used in the product. When a product contains a large amount of sugar, it can be hidden in the ingredients by using lots of different kinds of sugar. For example, if the product has 1 cup of sugar and that was the highest ingredient, sugar would be listed as the first ingredient. This can be avoided by using smaller amounts of different sources of sugar and listing them lower in the ingredient list. Here are the most common sources of sugar found on food labels:

- Brown sugar
- Corn sweetener
- Corn syrup
- Dextrose
- Fructose
- Fruit-juice concentrate
- Glucose
- High-fructose corn syrup (HFCS)
- Honey
- Invert sugar
- Lactose
- Maltose
- Malt syrup
- Molasses
- Raw sugar
- Sucrose
- Syrup

What is the difference between nutritive and nonnutritive sweeteners?

The safety of our food and what goes in it is regulated by the Food and Drug Administration (FDA). When you read the ingredients on your food labels you, will notice things that are not from your basic food groups. Foods from the food groups (grains, vegetables, fruits, milk, meat, and oils) are considered nutritive because they provide nourishment. Products that are added and do not provide any nourishment can be considered nonnutritive.

We like to believe that nothing would be allowed in our food that wasn't considered 100% safe. Unfortunately, this kind of guarantee is not usually possible. In the United States, sweeteners fall under the Generally Recognized as Safe (GRAS) list or as food additives under the 1958 Food Additives Amendment to the Federal Food, Drug, and Cosmetic Act. According to the FDA, "Regardless of whether the use of a substance is a food additive use or is GRAS, there must be evidence that the substance is safe under the conditions of its intended use. FDA has defined "safe" as a reasonable certainty in the minds of competent scientists that the substance is not harmful under its intended conditions of use. The specific data and information that demonstrate safety depend on the characteristics of the substance, the estimated dietary intake, and the population that will consume the substance."

The guidelines about what constitutes a sweetener to be on the GRAS list versus being listed as a food additive are as follows:

- For a GRAS substance, generally available data and information about the use of the substance are known and accepted widely by qualified experts, and there is a basis to conclude that there is consensus among qualified experts

that those data and information establish that the substance is safe under the conditions of its intended use.

- For a food additive, privately held data and information about the use of the substance are sent by the sponsor to FDA and FDA evaluates those data and information to determine whether they establish that the substance is safe under the conditions of its.

Throughout the remainder of this article, you will learn about the positive and negative sides of the story behind each of the FDA-approved nutritive and nonnutritive sweeteners.

What are sugar alcohols?

Sugar and sugar alcohols are each considered nutritive sweeteners because they provide calories when consumed. Sugar alcohols, or polyols, contain fewer calories than sugar. Sugar provides 4 kcal/gram, and sugar alcohols provide an average of 2 kcal/gram (range from 1.5 kcal/gram to 3 kcal/gram). Contrary to their name, sugar alcohols are neither sugars nor alcohols. They are carbohydrates with structures that only resemble sugar and alcohol.

Foods that contain sugar alcohols can be labeled sugar-free because they replace full-calorie sugar sweeteners. Sugar alcohols have been found to be a beneficial substitute for sugar for reducing glycemic response, decreasing dental cavities, and lowering caloric intake.

Sugar alcohols naturally occur in many fruits and vegetables but are most widely consumed in sugar-free and reduced-sugar foods. The sweetness of sugar alcohols varies from 25% to 100% as sweet as table sugar (sucrose). The amount and kind being used will be dependant on the food. The following table lists the details on each of the sugar alcohols.

Sugar Alcohol	Calories/Gram	Sweetness Compared to Sucrose	Sources
Sorbitol	2.6	50% to 70%	Sugar-free hard and soft candies, chewing gum, flavored jam and jelly spreads, frozen foods, and baked goods
Mannitol	1.6	50% to 70%	Chewing gum, hard and soft candies, flavored jam and jelly spreads, confections, and frostings
Xylitol	2.4	100%	Chewing gum, hard candies, and pharmaceutical products
Erythritol	0.2	60% to 80%	Confectionery and baked products, chewing gum, and some beverages
Isomalt	2.0	45% to 65%	Hard and soft candies, ice cream, toffee, fudge, lollipops,

			wafers, and chewing gum
Lactitol	2.0	30% to 40%	Chocolate, cookies and cakes, hard and soft candies, and frozen dairy desserts
Hydrogenated starch hydrolysates (HSH)	3.0	25% to 50%	Sugar-free foods and candies, and low-calorie foods
Maltitol	2.1	90%	Sugar-free chocolate, hard candies, chewing gum, baked goods, and ice cream

Are there any safety concerns with sugar alcohols?

Sugar alcohols are regulated as either GRAS or a food additive. The FDA has filed GRAS affirmation petitions for isomalt, lactitol, maltitol, HSH, and erythritol. Sorbitol is on the GRAS list, while mannitol and xylitol are listed as additives.

The reason that sugar alcohols provide fewer calories than sugar is because they are not completed absorbed in our body. For this reason, high intakes of foods containing some sugar alcohols can lead to abdominal gas and diarrhea. Any foods that contain sorbitol or mannitol must include a warning on their label that "excess consumption may have a laxative effect." The American Dietetic Association advises that intakes greater than 50 grams/day of sorbitol or greater than 20 grams/day of mannitol may cause diarrhea.

The presence of sugar alcohols in foods does not mean that you can eat unlimited quantities. Sugar alcohols are lower in calories, gram for gram, than sugar, but they are not calorie free, and if eaten in large enough quantities, the calories can be comparable to sugar-containing foods. You will need to read the food labels for the calorie and carbohydrate content regardless of the claim of being sugar free, low sugar, or low carb.

What are nonnutritive sweeteners?

The use of nonnutritive sweeteners began with the need for cost reduction and continued on with the need for calorie reduction. It is interesting that artificial sweeteners were actually chemicals being developed for another purpose when the researcher tasted it and found that it was sweet. Since the 1950s, nonnutritive sweeteners have become a weight-loss wonder that allowed us to have our sweets without the calories and cavities. Between 1999 and 2004 more than 6,000 new products containing artificial sweeteners were launched. They are found in so many products now that people can be consuming them without even knowing it. The National Household Nutritional Survey estimated that as of 2004, 15% of the population was regularly using artificial sweeteners. These nonnutritive sweeteners are also referred to as intense sweeteners, sugar substitutes, alternative sweeteners, very low-calorie sweeteners, and artificial sweeteners.

The names of the five FDA-approved nonnutritive sweeteners are saccharin, aspartame, acesulfame potassium, sucralose, and neotame. Each of these is regulated as a food additive. These nonnutritive sweeteners are evaluated based on their safety, sensory qualities (for example, clean sweet taste, no bitterness, odorless), and stability in various food environments. They are often combined with other nutritive and/or nonnutritive sweeteners to provide volume that they lack on their own and a desired flavor. An acceptable daily intake (ADI) for each additive has been established. The ADI is the amount of food additive that can be consumed daily over a lifetime without appreciable health risk to a person on the basis of all the known facts at the time of the evaluation.

The facts about the safety of these artificial sweeteners are not clear cut. There tends to be a split in

the medical community for being for or against their use. Each side has compelling points and that is what you will read under the pros and cons.

Saccharin: What are the pros?

Saccharin has been around for over 100 years and claims to be the "best researched sweetener." It was discovered when a researchers was working on coal tar derivatives. Saccharin is also known as Sweet and Low, Sweet Twin, Sweet'N Low, and Necta Sweet. It does not contain any calories, does not raise blood sugar levels, and its sweetness is 200 to 700 times sweeter than sucrose (table sugar). It has a bitter aftertaste.

The FDA's guidelines on the use of saccharin for beverages are not to exceed 12 mg/fluid ounce, and in processed food, the amount is not to exceed 30 mg per serving. The acceptable daily intake (ADI) for saccharin is 5 mg/kg of body weight. To determine your ADI, divide your weight in pounds by 2.2 and then multiply it by 5. For example, if you weighed 180 lbs., your weight in kg would be 82 (180 divided by 2.2) and your ADI for saccharin would be 410 mg (5 x 82). Saccharin is used in tabletop sweeteners, baked goods, jams, chewing gum, canned fruit, candy, dessert toppings, and salad dressings. It also is used in cosmetic products, vitamins, and pharmaceuticals.

In 1977, research showed bladder tumors in male rats with the ingestion of saccharin. The FDA proposed a ban on saccharin based on the Delaney Clause of the Federal Food, Drug, and Cosmetic Act enacted in 1958. This clause prohibits the addition to the human food supply of any chemical that had caused cancer in humans or animals. Congress intervened after public opposition to the ban. This was the only artificial sweetener available at that time and the public did not want to lose the diet products that contained it. Congress allowed saccharin to remain in the food supply as long as the label carried this warning: "Use of this product may be hazardous to your health. This product contains saccharin which has been determined to cause cancer in laboratory animals." Further research was required to confirm the tumor findings.

Since then, more than 30 human studies have been completed and found that the results found in rats did not translate to humans, making saccharin safe for human consumption. The reason for this may be that the original study gave the rats an amount that was hundreds of times higher than "normal" ingestion for humans. In 2000, the National Toxicology Program (NTP) of the National Institutes of Health concluded that saccharin should be removed from the list of potential carcinogens. The warning has now been removed from saccharin-containing products. Out of the five FDA-approved artificial sweeteners, saccharin is often chosen to be the safest.

Saccharin: What are the cons?

The safety concerns of consuming products with saccharin remain even with the removal of the warning. According to a report written in 1997 by the Center for the Science in Public Interest (CSPI) in response to the National Toxicology Program (NTP) removing saccharin from the list of potential carcinogens, "It would be highly imprudent for the NTP to delist saccharin. Doing so would give the public a false sense of security, remove any incentive for further testing, and result in greater exposure to this probable carcinogen in tens of millions of people, including children (indeed, fetuses). If saccharin is even a weak carcinogen, this unnecessary additive would pose an intolerable risk to the public. Thus, we urge the NTP on the basis of currently available data to conclude that saccharin is 'reasonably anticipated to be a human carcinogen' because there is 'sufficient' evidence of carcinogenicity in animals (multiple sites in rats and mice) and 'limited' or 'sufficient' evidence of carcinogenicity in humans (bladder cancer) and not to delist saccharin, at least until a great deal of further research is conducted."

Another possible danger of saccharin is the possibility of allergic reactions. The reaction would be in response to it belonging to a class of compounds known as sulfonamides, which can cause allergic reactions in individuals who cannot tolerate sulfa drugs. Reactions can include headaches, breathing difficulties, skin eruptions, and diarrhea. It's also believed that the saccharin found in some infant formulas and can cause irritability and muscle dysfunction. For these reasons, many people still

believe that the use of saccharin should be limited in infants, children, and pregnant women. Without research to support these claims, the FDA has not imposed any limitations.

Aspartame: What are the pros?

Aspartame was discovered in 1965 by a scientist trying to make new ulcer drugs and approved by the FDA in 1981 for dry uses in tabletop sweeteners, chewing gum, cold breakfast cereals, gelatins, and puddings. It was able to be included in carbonated beverages in 1983. In 1996, the FDA approved its use as a "general purpose sweetener," and it can now be found in more than 6,000 foods.

Aspartame is also known as Nutrasweet, Equal, and Sugar Twin. It does provide calories, but because it is 160 to 220 times sweeter than sucrose, very small amounts are needed for sweetening so the caloric intake is negligible. The FDA has set the acceptable daily intake (ADI) for aspartame at 50 mg/kg of body weight. To determine your ADI, divide your weight in pounds by 2.2 and then multiply it by 50. For example, if you weigh 200 lbs., your weight in kg would be 91 (200 divided by 2.2) and your ADI for aspartame would be 4550 mg (50 x 91). Here is the amount of aspartame in some common foods:

- 12 oz. diet soda -- up to 225 mg of aspartame
- 8 oz. drink from powder -- 100 mg of aspartame
- 8 oz. yogurt -- 80 mg of aspartame
- 4 oz. gelatin dessert -- 80 mg of aspartame
- ¾ cup of sweetened cereal -- 32 mg of aspartame
- 1 packet of Equal -- 22 mg of aspartame
- 1 tablet of Equal -- 19 mg of aspartame

Aspartame has been approved for use in over 100 countries. An editorial in the *British Medical Journal* states that the "evidence does not support links between aspartame and cancer, hair loss, depression, dementia, behavioral disturbances, or any of the other conditions appearing in web sites. Agencies such as the Food Standards Agency, European Food Standards Authority, and the Food and Drug Administration have a duty to monitor relations between foodstuffs and health and to commission research when reasonable doubt emerges. Aspartame's safety was convincing to the European Scientific Committee on Food in 1988, but proving negatives is difficult, and it is even harder to persuade vocal sectors of the public whose opinions are fuelled more by anecdote than by evidence. The Food Standards Agency takes public concerns very seriously and thus pressed the European Scientific Committee on Food to conduct a further review, encompassing over 500 reports in 2002. It concluded from biochemical, clinical, and behavioral research that the acceptable daily intake of 40 mg/kg/day of aspartame remained entirely safe -- except for people with phenylketonuria."

Aspartame: What are the cons?

Aspartame is one of the most controversial artificial sweeteners. There are numerous web sites, books, and articles stating various reasons why aspartame should not be consumed. Some site studies to support their theories while others base their claims on industry-related conspiracies. One fact is that aspartame does get metabolized, meaning that it doesn't get excreted in the same form that it is when ingested. This is the reason why it can't be consumed by people with the metabolism disorder PKU. The following is a summary of some of the controversial dangers of consuming aspartame.

Industry conspiracies: Conflicts of interest in the studies performed on aspartame and the way in which its approval was obtained is an ongoing controversy. Dr. Robert Walton surveyed the studies of aspartame in the peer-reviewed medical literature. He states that of the 166 studies felt to have relevance for questions of human safety, 74 had Nutrasweet industry (those who make aspartame) related funding and 92 were independently funded. One hundred percent of the research performed by the company who makes aspartame confirmed aspartame's safety, whereas 92% of the independently funded research found problems with consuming aspartame. Other reports of federal employees working for the companies responsible for the testing and distribution of aspartame are cited on all of the sites and books opposing the use of aspartame.

Aspartame disease: H.J. Roberts, MD, coined the term "aspartame disease" in a book filled with over 1,000 pages of information about the negative health consequences of ingesting aspartame. Dr. Roberts reports that by 1998, aspartame products were the cause of 80% of complaints to the FDA about food additives. Some of these symptoms include headache, dizziness, change in mood, vomiting or nausea, abdominal pain and cramps, change in vision, diarrhea, seizures/convulsions, memory loss, and fatigue. Along with these symptoms, links to aspartame are made for fibromyalgia symptoms, spasms, shooting pains, numbness in your legs, cramps, tinnitus, joint pain, unexplainable depression, anxiety attacks, slurred speech, blurred vision, multiple sclerosis, systemic lupus, and various cancers. While the FDA has assured us that the research does not show any adverse health complications from aspartame, there has been some evidence to suggest that some of the following symptoms can be related to aspartame.

Headaches: One study confirmed that individuals with self-reported headaches after the ingestion of aspartame were in deed susceptible to headaches due to aspartame. Three randomized double-blind, placebo-controlled studies with more than 200 adult migraine sufferers showed that headaches were more frequent and more severe in the aspartame-treated group.

Depression: In a study of the effect of aspartame on 40 patients with depression, the study was cut short due to the severity of reactions within the first 13 patients tested. The outcome showed that individuals with mood disorders were particularly sensitive to aspartame and recommended that it be avoided by them.

Cancer: In an initial study, 12 rats out of 320 developed malignant brain tumors after receiving aspartame in an FDA trial. There have been other studies to both support and contradict this finding. A recent study, conducted by Italian and French researchers indicates there is no association between low-calorie sweeteners and cancer. The researchers evaluated a variety of studies between the years of 1991 and 2004. These studies assessed the relationship between low-calorie sweeteners and many cancers, including oral and pharynx, esophagus, colon, rectum, larynx, breast, ovary, prostate, and renal cell carcinomas. The researchers examined the eating habits of more than 7,000 men and women in their middle ages (mainly 55 years and over). Based on the data evaluated, there was no evidence that saccharin or other sweeteners (mainly aspartame) increase the risk of cancer at several common sites in humans. The debate continues while more research is conducted.

Increased hunger: A study done with 14 dieters comparing the effects of aspartame-sweetened and sucrose-sweetened soft drinks on food intake and appetite ratings found that substituting diet drinks for sucrose-sweetened ones did not reduce total calorie intake and may even have resulted in

a higher intake on subsequent days. In another study of 42 males given aspartame in diet lemonade versus sucrose-sweetened lemonade, there was no increase in hunger ratings or food intake with the diet group. Weight loss results from consuming fewer calories than your body needs. When you replace a caloric beverage with a noncaloric beverage, you will be saving calories and could lose weight if it is enough calories to put you in a negative balance. For aspartame to increase weight, there would have to be something else going on. There is not enough research to determine if something does exist so the jury is still out on this one.

Sucralose: What are the pros?

Sucralose is the newest nonnutritive sweetener on the market. It is most well known for its claim to be made from sugar. It is used alone or found in Splenda and is 600 times sweeter than sucrose (table sugar). When used alone, it provides essentially no calories and is not fully absorbed. In 1998, it was approved for limited use, and in 1999, it was given approval for use as a general-purpose sweetener. It is currently found in over 4,500 products, including foods that are cooked or baked. This artificial sweetener that can be used for cooking, so it has rapidly become one of the most popular and highly consumed artificial sweeteners.

The FDA reviewed studies in human beings and animals and determined that sucralose did not pose carcinogenic, reproductive, or neurological risk to human beings. The acceptable daily intake (ADI) for sucralose was set at 5 mg/kg of body weight/day. To determine your ADI, divide your weight in pound by 2.2 and then multiply it by 50. For example, if you weigh 200 lbs., your weight in kg would be 91 (200 divided by 2.2) and your ADI for sucralose would be 455 mg (91 x 5).

Sucralose: What are the cons?

The most misunderstood fact about sucralose is that it is nothing like sugar even though the marketing implies that it is. Sucralose was actually discovered while trying to create a new insecticide. It may have started out as sugar, but the final product is anything but sugar. According to the book *Sweet Deception*, sucralose is made when sugar is treated with trityl chloride, acetic anhydride, hydrogen chlorine, thionyl chloride, and methanol in the presence of dimethylformamide, 4-methylmorpholine, toluene, methyl isobutyl ketone, acetic acid, benzyltriethlyammonium chloride, and sodium methoxide, making it unlike anything found in nature. If you read the fine print on the Splenda web site, it states that "although sucralose has a structure like sugar and a sugar-like taste, it is not natural."

The name sucralose is misleading. The suffix *-ose* is used to name sugars, not additives. Sucralose sounds very close to sucrose, table sugar, and can be confusing for consumers. A more accurate name for the structure of sucralose was purposed. The name would have been trichlorogalactosucrose, but the FDA did not believe that it was necessary to use this so sucralose was allowed.

The presence of chlorine is thought to be the most dangerous component of sucralose. Chlorine is considered a carcinogen and has been used in poisonous gas, disinfectants, pesticides, and plastics. The digestion and absorption of sucralose is not clear due to a lack of long-term studies on humans. The majority of studies were done on animals for short lengths of time. The alleged symptoms associated with sucralose are gastrointestinal problems (bloating, gas, diarrhea, nausea), skin irritations (rash, hives, redness, itching, swelling), wheezing, cough, runny nose, chest pains, palpitations, anxiety, anger, moods swings, depression, and itchy eyes. The only way to be sure of the safety of sucralose is to have long-term studies on humans done.

Splenda is a product that contains the artificial sweetener sucralose, but that is not all that it contains. Sucralose does have calories, but because it is 600 times sweeter than sugar, very small amounts are needed to achieve the desired sweetness so you most likely won't consume enough to get any calories. The other two ingredients in Splenda are dextrose and maltodextrin, which are used to increase bulk and are carbohydrates that do have calories. One cup of Splenda contains 96 calories and 32 grams of carbohydrates, which is often unnoticed due to the label claiming that it's a

no calorie sweetener. Because this is found in so many products and can be used in cooking, it can be possible to consume 1 cup or more each day. For people with diabetes, this is a significant amount of carbohydrates, and for people who are watching their weight, this can be a problem. Consuming an additional 100 calories a day can result in a weight gain of 10 lbs. per year!

A recent study found that Splenda affected the absorption of medications in rats. The rats were given sucralose at doses of 1.1-11 mg/kg. After 12-weeks, they found that the rats had half of the good bacteria in the gut. They also found that Splenda interferes with the absorption of prescription medications. Other research studies have come out to show that this is not what happens. The only way to know for sure is to perform long-term studies in humans. Unfortunately, this takes time. It can also be dangerous if this is actually happening. The limited number of studies and lack of long-term studies on sucralose means that we are going to have to learn things like this as we go.

Acesulfame K: What are the pros?

Acesulfame K has been an approved sweetener since 1988, and yet most people are not even aware that this is an artificial sweetener being used in their food and beverages. It is listed in the ingredients on the food label as acesulfame K, acesulfame potassium, Ace-K, or Sunett. It is 200 times sweeter than sucrose (table sugar) and is often used as a flavor-enhancer or to preserve the sweetness of sweet foods. The FDA has set an acceptable daily intake (ADI) of up to 15 mg/kg of body weight/day.

Acesulfame K: What are the cons?

The problems surrounding acesulfame K are based on the improper testing and lack of long-term studies. Acesulfame K contains the carcinogen methylene chloride. Long-term exposure to methylene chloride can cause headaches, depression, nausea, mental confusion, liver effects, kidney effects, visual disturbances, and cancer in humans. There has been a great deal of opposition to the use of acesulfame K without further testing, but at this time, the FDA has not required that these tests be done.

Neotame: What are the pros?

In 2002, the FDA approved a new version of aspartame called Neotame. Neotame is chemically related to aspartame without the phenylalanine dangers for individuals with PKU. It is much sweeter than aspartame with a potency of approximately 7,000 to 13,000 times sweeter than sucrose (table sugar).

Neotame is also being promoted for use as a flavor enhancer that "accentuates and lifts the flavors in food." The neotame web site states that it's safe for use by people of all ages, including pregnant or breastfeeding women, teens and children, and can be used in cooking. The FDA has set an acceptable daily intake (ADI) at 18 mg/kg of body weight/day.

Neotame: What are the cons?

Neotame entered the market much more discreetly than the other artificial sweeteners. While the web site for neotame claims that there are over 100 scientific studies to support its safety, they are not readily available to the public. Opponents of neotame claim that the studies that have been done do not address the long-term health implications of using this sweetener. The chemical similarity that it has to aspartame may mean that it can cause the same problems that are associated with that. Without scientifically sound studies done by independent labs, there is no way to know if this is safe and for whom it is safe.

Do artificial sweeteners cause weight gain?

One of the most disturbing claims against artificial sweeteners is that they can cause weight gain. The majority of the people who use these products often do so in order to save calories to lose or maintain weight. We are told that this is why we need to consume them and it would be upsetting to find out that they have actually been a part of the problem and not the solution. At this time, the research is showing both possibilities.

The research that shows weight gain with artificial-sweetener consumption has been around since the 1970s. The Nurses' Health Study in 1970 found weight gain over eight years in 31,940 women using saccharin. In the early '80s, the American Cancer Society's study of 78,694 women found that after one year 2.7% to 7.1% more regular artificial-sweetener users gained weight compared to nonusers. The San Antonio Heart Study followed 3,682 adults over eight years on the early '80s. Those who consumed more artificial sweeteners had higher BMIs, and the more that they consumed, the higher the BMI.

In some studies where they replaced sugar-sweetened beverages with artificial sweetened ones, no difference in weight loss was shown. The possible cause of this could be that artificial sugar actually increases sugar cravings. The theory is that our bodies sense the sweetness of the food and expect the calories. When you consume the artificial sweetener without the calories, your body continues to crave the calories so you end up eating more calories later on. In rat studies, rats fed diets with artificial sweeteners ate more calories all day then those fed meals with sugar. There may also be a connection a with a complex food reward pathway that drives our desire to eat. The sweetness without the calories interferes with the normal process of this pathway causing an increased craving for sweets.

A final possibility for the relationship between artificial sweeteners and weight gain is the impact that high amounts of sweet taste has on how much we need to feel satisfied. Artificial sweeteners are hundreds to thousands of times sweeter then sugar. It has been found that repeated exposure to a flavor trains flavor preferences. Think of how your tastes buds get used to new flavors when you makes changes in your diet. When people cut back on their intake of salt or fat there will be a preference for lower levels of these in their diets after several weeks. Anyone who gets used to skim milk will tell you that whole milk tastes too strong for them. The same is true for salty foods. The difference with these and cutting back on sugar is that artificial sweeteners are put in place of sugar so you never get the chance to get used to consuming less of that taste.

The best way to know if artificial sweeteners are impacting your weight is to experiment. Cut them out of your diet and see what happens. The key is not to add too many calories from sugar. Give your body time to get used to the change. Your sugar cravings will start off strong, but you should see a decrease over time. It may be the diet secret that you have been searching for.

Can everyone consume artificial sweeteners?

It can be difficult to determine if there will be any long-term health problems if you consume artificial sweeteners during pregnancy or during childhood. None of the manufacturers say that you can't consume them, but none of them have long-term studies that prove that it is safe to do so.

Pregnancy is a time when every bite and sip that a woman takes really matters. There have been studies in rats that show when life span exposure to artificial sweeteners begins during fetal life, its carcinogenic effects are increased. The Danish National Birth Cohort is a study of 59,334 women conducted from 1996 to 2002. They found that daily intake of artificially sweetened soft drinks may increase preterm delivery.

There are numerous studies that show the negative health consequences of diets high in sugar for children. Many measures are being taken to help decrease the amount of sugar that children consume. This means that many people are turning to artificially sweetened foods and beverages for a child's sweet tooth. Unfortunately, there are no studies on the effects of these sweeteners and possible long-term consequences of children consuming them.

When possible, it's best for pregnant women and children to avoid artificial sweeteners. If they are

When possible, it's best for pregnant women and children to avoid artificial sweeteners. If they are used, they should be used in moderation. It's always important to weigh the overall health benefits when choosing foods and beverages. Consult your doctor if you have any questions or concerns about this.

Is it safe to blend artificial sweeteners?

Many people have a preference for a specific sweetener without realizing that numerous products now contain combinations of nutritive and/or nonnutritive sweeteners. The following are three key advantages for these sweetener blends:

- **Taste**: The major limitation to the use of saccharin is its bitter aftertaste. Combining saccharin with other sweeteners helps alleviate this problem.

- **Cost**: Using combinations of nonnutritive sweeteners can result in a sweeter taste with less sweeteners, saving companies money.

- **Flexibility**: The ability to combine nonnutritive and nutritive sweeteners can offer people low-calorie choices, along with the no-calorie ones.

The blending of sweeteners is presenting a whole new set of problems. Research has not been done, and is not required to be done, on combinations of sweeteners. There is no way to know what happens to the chemicals once they are combined in the products or how they are processed in our bodies in that combination. This is an unnecessary risk that is being taken. The proper procedure would be to require thorough, credible studies on the safety of these combinations before allowing them into our food and medicine. While it would take time and money to conduct these tests, it's clearly a case where it's better to be safe than sorry.

Can you get something for nothing?

Our innate desire for sweetness may be interfering with our ability to judge right from wrong. There is nothing in our diet that we can consume without a cost. The cost can be excess calories, fat, protein, or carbohydrates. It's even possible to consume excess water. We see calorie- and sugar-free sweeteners and believe that there isn't a cost, but maybe there is. Unfortunately, the research that has been done is failing us. With two sides battling over the safety of these sweeteners, it's imperative that we get the answers from the "gold standard" of research studies: independent, randomized, double-blinded, placebo-controlled studies. It's our responsibility to be aware of what we are consuming and to protect our safety.

Acceptable daily intakes have been set for each nonnutritive sweetener for a reason; we can't ingest unlimited quantities of these additives. If you believe that you are experiencing any of the symptoms from the consumption of a nutritive or nonnutritive sweetener, then eliminating them from your diet is the best way to determine if it's so. Sweeteners are not essential nutrients in our diet, so they exist to nurture our sweet tooth, not our bodies.

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