ıilder" approach and use antihistamines like Benadryl instead of epi-
hrine. But if a person is showing signs of serious allergic reaction,
ıying epinephrine administration could be life threatening. Benadryl
sn't treat anaphylaxis.

AT'S IN MY HOME?

kids are lucky: they have almost no relatives with allergies. So on this
ıt I have been quite liberal. However, I have taken care of a shocking
nber of peanut-allergic kids with no (or minimal) family history of
rgy. After a while, I began to suspect that peanut exposure in the
nb or through breast milk may increase the likelihood of allergy.
ny studies and the AAP disagree. But I still chose to skip peanuts and
nut butter while pregnant and breast-feeding my own kids, just to put
mind at ease.

Chapter 2

Artificial Sweeteners

WHAT IS THE QUESTION?

For most people, sugar is a treat, a pleasure, a temptation. We save dessert for last, earning it after we eat a healthy meal. Sugar gives us a burst of energy by providing a surge of glucose to rev our body engines.

Of course, we all know that sugar is unhealthy. It causes tooth decay. Like any other high-calorie food, when eaten in excess it causes stomach upset in the short run and obesity in the long run. And it is blamed—probably unrightfully so—for toddlers' uncontrollable behavior and teenagers' pimples.

Ours is a culture of invention: if we want something we can't have, we find a way to have it. So artificial sweeteners were invented, replacing the calories of sugar without reducing any sweet taste. First came saccharin, then aspartame and sucralose and others. With these additives, we were supposed to be able to have our cake and eat it too. Literally.

Artificial sweeteners have become a major component of processed foods over the past twenty years. Each sweetener has been studied thoroughly by the **FDA** and largely deemed safe. But rumors continuously swirl about possible associations with cancer. Are these sugar alternatives really harmless? How about for our children, who will consume these products during their entire lifetime? Or can these sweeteners help in the battle against bulging waistlines? Do the benefits of replacing natural sugar with chemical alternatives outweigh the risks?

WHAT IS THE DATA?

Sugar consumption is an American pastime. The average American ingests twenty teaspoons of sugar every day. About 60 percent of this comes from corn sweeteners and 40 percent from sucrose (table sugar). A very small amount also comes from sweetening sources like honey and molasses, but it is relatively insignificant by comparison.

Sugar has served an important role in our evolution. It is a quick source of energy, a fuel for running, jumping, and other physical activities. In the days of the caveman and the hunter-gatherer, a sugar infusion followed by an energy surge had obvious benefits. But in today's society, which is far more sedentary, sugar often just delivers empty calories.

Sugar itself doesn't make a person obese. Becoming overweight is a result of consuming more calories than your body needs. But sugary foods tend to be high in calories and are often eaten in large quantities. So when a person has too much sugar on a daily basis, the result is a surplus of calories. Excess calories are stored by the body as fat—saving for a day when there may not be enough fuel around.

To lose weight, calorie consumption needs to be decreased or the number of calories burned each day increased. But food that is naturally less caloric usually doesn't taste as good. So dieters often turn to alternative sweeteners with fewer calories, which seems like a reasonable compromise. Ironically, though, as the number of artificial sweeteners on the market has expanded, so have American waistlines. The more people gain, the more "diet" foods they seek out to meet their sweet cravings without fattening them up. Even though this strategy hasn't prevented ongoing weight gain, people continue on their search for a panacea, consuming more and more alternative sweeteners. As a result, over the past 130 years we have seen the introduction of saccharin (first discovered in 1879), aspartame (1965), and sucralose (1976). Newer substitutes include sugar alcohols (sorbitol, xylitol, maltitol, and others) and stevia.

Before 1958 the only sugar substitute available was saccharin, and it was essentially unregulated. Saccharin is three hundred times sweeter than sugar. This potency allows only a small amount of saccharin to be used in order to sweeten a food. Shortly after it was discovered, it became a very effective tool for combating sugar shortages, particularly during both world wars. In 1957 Benjamin Eisenstadt and his son Marvin

invented Sweet'N Low, the first marketed and distributed sugar substitute. Soon to follow were the individual-use pink packets still found on restaurant tables today.

In 1958 came the Food Additives Amendment to the Food, Drug, and Cosmetic Act. This required the FDA to provide premarket testing and approval for **food additives**. Because saccharin was already on the market, it was grandfathered out of this requirement. It fell under the category of GRAS, short for "generally recognized as safe," and did not require formal study.

In response to public demand, the FDA began to study many GRAS substances in the early 1970s. In 1972 data emerged suggesting a possible link between saccharin and bladder cancer in rats. This data and its study methods became the subject of much public debate, with claims including that the researchers gave the rats the equivalent of eight hundred diet sodas per day, but saccharin remained largely unregulated. Five years later, in 1977, a Canadian study documented the same association. This time the FDA reacted swiftly by recommending a complete ban on saccharin except as an over-the-counter drug in the form of a tabletop sweetener. Almost simultaneously, Congress passed a moratorium called the Saccharin Study and Labeling Act, and for the next two years, while it was undergoing further safety studies, saccharin was allowed to remain on the market as long as it carried the label "Use of this product may be hazardous to your health. This product contains saccharin, which has been determined to cause cancer in laboratory animals." This moratorium was renewed several times until finally, in 1991, the FDA withdrew its proposal to ban saccharin, citing sufficient safety data in newer studies. In 2000 the **NTP** removed saccharin from its *Report on Carcinogens* and shortly thereafter Congress repealed the requirement for saccharin to carry a warning label.

Even though saccharin was ultimately vindicated, one might ask why a potentially harmful additive would be allowed to remain on the market throughout the 1970s, '80s, and '90s if there was any worrisome data at all. Why was the moratorium continually renewed? To get to the answer, it helps to put saccharin into historical perspective: in 1977 it was the only sugar alternative widely available. So while there were potential health concerns, long-term effects were outweighed by consumer demand. The short-term answer was to keep saccharin on the market

with a big, bold warning statement printed on the label. The ultimate solution was to develop a new sugar alternative. Enter aspartame.

Aspartame is an artificial nonsaccharide sweetener sold in little blue packets under the brand names Equal and NutraSweet. It is also used as an ingredient in more than six thousand foods, drinks, vitamin supplements, gums, candies, and other products sold worldwide. Aspartame is 180 times sweeter than sugar. For the same reason as saccharin (its potent sweetness), only a tiny bit needs to be used at any given time. Therefore it adds sweet flavor with essentially no calories.[1] Initially, the only flaw identified with aspartame was that it degrades with heat, so it is not useful in baking.

Aspartame was discovered in 1965 but faced prolonged FDA approval. In 1981 the FDA sanctioned it for use in some foods but did not consider it universally safe for all foods until 1996. A primary issue at hand was that aspartame is broken down by the body into several chemicals—like methanol, formaldehyde, and formate—each of which is potentially toxic at high doses. However, as the FDA notes on its Web site, citrus juices and tomatoes have similar by-products and, in fact, when metabolized by the body they can contain higher methanol concentrations. In other words, the by-products aspartame creates in the body don't seem to matter much.

There continue to be concerns and claims about links between aspartame and disease. Cancer—particularly brain tumors and lymphoma—remains the biggest. In 1996, just as the FDA was giving aspartame its final blessing, a study was published suggesting that aspartame consumption may be related to an increase in brain tumors (Olney 1996). That study was rebuked by the National Cancer Institute (NCI). a review of its database on cancer showed that the frequency of brain cancers started to increase in 1973—well before aspartame was approved—and after peaking in 1985 has actually decreased slightly. If aspartame were in fact a cause of brain cancer, you would expect to see an increase, not a decrease, in the disease as aspartame use has flourished. Still, NCI continues to study aspartame and currently has a study in progress looking at how dietary factors might be related to adult brain cancer.

As recently as 2006, NCI published data that illustrates no link between aspartame and cancer, and the FDA reaffirmed its vote of safety.

But one year later, a group of European researchers published completely contrary results—their study suggests that aspartame is in fact associated with lymphoma, leukemia, and breast cancer in rats (Soffritti 2007).

The seesawing results in aspartame research have become tiresome: Does it cause cancer? Yes. No. Yes. No. Some consumer watchdog groups have upgraded their aspartame rating from "use caution" to "everyone should avoid." The studies are murky enough that it's not worth using the sweetener if you don't have to. But even the executive director of one of the big watchdog groups has said: "The risk to an individual is quite small, so people shouldn't fear that if they have one diet soda a day they are going to develop cancer. . . . [And] if aspartame were that potent a carcinogen, I wonder if we wouldn't be seeing a real epidemic of cancer."[2]

Aspartame is accused of more than just cancer. It is the alleged cause of headaches, dizziness, gastrointestinal symptoms, mood changes, and even seizures. The CDC has explained this by saying that some people may be more sensitive to aspartame than others. The FDA still stands behind its approval of aspartame, though, stating there is no evidence for widespread adverse health effects and that none of the claims about noncancer effects have been substantiated in formal studies.[3]

When the FDA approves a food additive, it must determine a safe dose. In fact, it must identify "the amount of an additive that, if eaten every day for the rest of a person's life, would be considered safe." This is called the **ADI** or "acceptable daily intake." In many cases, the FDA identifies the highest dose that has no effects on experimental animals, divides by one hundred, and that is how much consumers are allowed to ingest. In other words, the ADI represents one one-hundredth the maximal dose found to be safe in lab animals.

For aspartame the ADI is 50 grams per kilogram of body weight. This means that a 165-pound (or 75 kg) adult could safely consume 3,750 mg of aspartame, the equivalent of twenty-one cans of diet soda, daily.[4] A 66-pound (30 kg) child can drink eight cans of soda. The average adult daily aspartame consumption is only about 5 percent of the ADI, or 200 mg per day.

Most aspartame studies equate milligrams of the sweetener with cans of soda. While this is a convenient measuring tool, aspartame is

present in many other drinks and foods that we consume every day. Therefore, when you try to estimate your own daily aspartame ingestion, you must consider breakfast cereals, gum, candy, yogurt, Popsicles, and much more, not just soda.

As I am a pediatrician, I must make a brief aside to warn that soda consumption by young children is a health hazard in itself. The more soda a child consumes, the less water or milk she drinks. As a result, soda consumption is often correlated with other poor nutritional indicators. Soda intake is also correlated with an increased risk of obesity. For a child who drinks a soda a day, the risk of becoming obese is increased by 60 percent (Ludwig 2001). Although many discussions of aspartame contain references to soda consumption, this does not mean that the medica community condones drinking soda.

Just as controversy over aspartame was beginning to snowball, alon came a different sugar substitute. Sucralose, known by the brand nam Splenda (sold for individual use in a little yellow packet), was discovere in 1976 and approved for consumption by the FDA in 1998. Sucralose i six hundred times sweeter than table sugar—that's twice as sweet as sac charin and almost four times as sweet as aspartame. But unlike its pre decessors, sucralose is actually made from sugar. Therefore, it manufacturers claim that sucralose tastes more like sugar. It is calor free, not just because so little is needed in order to sweeten, but als because it is indigestible by the human gut, so it passes straight throug your body without being absorbed.

Sucralose has been on the market for ten years and is already used n forty-five hundred different foods and drinks. It seems to be much le s controversial than aspartame or saccharin—at least so far. Initial FD A studies found no adverse effects of sucralose. Follow-up studies, thoug h, do show an association between high-dose sucralose ingestion a id migraines. There have also been some reports of allergic reactions, a id there has been very little data whatsoever about the effects of sucralose on children. But compared with allegations of seizures and cancer, sucral se has fared much better than other artificial sweeteners on the market.

Most rational people would react to all of this controversy over sy n- thesized sugar substitutes by seeking out natural alternatives. Rat er than ingest something chemical, why not turn to nature? Genu ne sweeteners seem so much more benign.

But the problem with the natural approach goes back to the reason sugar substitutes became popular in the first place: calories. Sugar is natural, as are honey, molasses, evaporated cane juice, rice syrup, and even (pure) apple juice. But these natural alternatives are just as high in calories as sugar, and they tend to stick to teeth, causing tooth decay.

There is a new generation of "natural" sugar substitutes called sugar alcohols. They get their name from their chemical composition, but they are neither true sugar nor alcoholic. The sugar alcohols—which include xylitol, sorbitol, maltitol, mannitol, lactitol, and isomalt—occur naturally in fruits and berries. They are lower in calories than sugar and a little less sweet as well, but, unlike all the other artificial sweeteners discussed so far, they are not calorie free.

Sugar alcohols are used most commonly in sugar-free candies, gums, and cookies. When eaten in high concentration, these substances will cause a cooling sensation in the mouth. Hence the refreshing taste of a sugar-free candy or gum. For the same reason, sugar alcohols are used in toothpastes and mouthwashes. Another bonus: sugar alcohols don't cause tooth decay, which is especially beneficial because they are often used as sweeteners in gums.

Sugar alcohols do come with negative side effects, though. The primary complaint is that when eaten in excess, these ingredients can cause either bloating or diarrhea. Like the natural sugars in fruit juice, too much has a laxative effect. The other complaint has to do with weight gain: when people overindulge, sugar alcohols cause weight gain. This is simply a reflection of the fact that these sweeteners are not calorie free.

The FDA considers the safety of each sugar alcohol individually. Some fall under the GRAS provision, as they were used widely before the Food Additives Amendment to the Food, Drug, and Cosmetic Act in 1958. Remember that GRAS just means "generally recognized as safe." This classification comes from the rationale that if something has been in widespread use for many years and has no correlated dangers, or if qualified experts have deemed it safe, then it must be fine. Of course, the flip side of that argument is that a GRAS substance has yet to be studied carefully because it is not subject to the level of scrutiny otherwise imposed by the FDA and other regulatory agencies.

Sugar alcohols seem to be following a trajectory similar to sucralose:

while some complaints have been raised, there has been no controve sy approaching the drama surrounding saccharin or aspartame.

The last on the list of sugar alternatives is stevia, a sweetener deri ed from a South American shrub. Stevia extracts are up to three hund ed times sweeter than sugar, offering a familiar low-calorie alternative. But in the United States stevia cannot be sold under the title "sweetener" or "food additive." Rather, it is labeled a "**dietary supplement**."[5]

The stevia labeling game illustrates how the FDA labels ingredi nts and why this matters in the first place. The FDA defines a food addi ive as a substance that will become part of a food and in many cases will change that food's consistency, flavor, or packaging. A dietary sup le-ment is quite different: it is a product meant to augment the diet by a dd-ing a vitamin or mineral or even medicine.[6]

With stevia, there were questions about its safety, with some p ub-lished studies implicating it as a mutagen, a substance that causes c lls to mutate and become a precursor to some cancers. As a result, st via was denied classification as a food additive and instead called a die ary supplement. Why does this matter? Well, for people in the busine s of selling stevia the classification as a dietary supplement signific ntly reduces its presence in processed foods. The gum or candy or brea fast cereal you buy at the store is sweetened with a food additive, not a die tary supplement. But it seems pretty clear that stevia is not a supplemen —it is not meant to be a vitamin or added bonus to your daily intake, a d it is certainly not a medicine. It is meant to replace sugar. So essent ally, the FDA has limited stevia's ability to break into the processed f ods market by calling it something (a dietary supplement) that it isn't.

While it may sound like I am on stevia's side, I am actually not. Rather, I am bothered by the FDA's approach. Instead of rejecting s evia as a sweetener altogether, the FDA essentially gave it a demotion and called it a dietary supplement. There is published data showing s fety concerns and possibly even data demonstrating true risks of inge sting stevia. Why, then, is stevia allowed to be sold as anything? If the e are real concerns, why should stevia appear on the shelf at GNC with mul-tivitamins and immune boosters? Rather, if stevia—or any produ t—is potentially dangerous, I think it should be banned from the marke place altogether.

Consumers don't recognize the semantic twist of swapping "su pple-

ment" for "additive"—and why should they? In the case of stevia, the labeling has been sneaky. By definition, the FDA does not guarantee the safety of dietary supplements. Presumably some—like stevia—aren't safe enough to be called food additives. But nutritional supplements and vitamins have become massive players on the supermarket shelves and in their own storefronts. These products continue to be peddled to the public without concern. The example of stevia makes me wonder what health claims exist against other dietary supplements.[7]

Perhaps all of this is overkill. Stevia extracts are used around the world, including Japan and many countries in South America. In 2006 **WHO** published a formal statement that stevia and its breakdown prod-ucts are not mutagens and there is no evidence linking them to cancer. Furthermore, WHO suggested that there may even be health benefits to stevia for certain patients, like those with hypertension or type 2 dia-betes. These health claims have surfaced many times over the past few years, but this was the first time a major health organization invoked them in a policy statement.

WHAT IS THE BOTTOM LINE?

There is a tremendous amount of conflicting data about sugar substi-tutes. Americans are always looking for a calorie-free way to eat sweets. The problem is that in order to avoid sugar calories our treats have to be sweetened with artificial sweeteners. While there is no hard-and-fast data showing a link between saccharin or aspartame or sucralose or ste-via and disease in humans, there is suspicion fueled by animal studies. To complicate the issue, future generations of children (unlike today's adults) will have a lifetime of exposure to these sweeteners, and we have no idea what the long-term implications are.

The other problem is that even with calorie-free sugar alternatives, Americans continue to gain weight at a rapid clip. Portion size in this country is enormous, and exercise is at an all-time low. People think that the words "diet" or "sugar free" on a label mean they can eat as much as they want and not gain weight. This is far from the truth, and there are major long-term health consequences to being overweight or obese.

So ultimately, this is yet another area where the general rule of thumb should be: everything in moderation. An occasional diet food is

fine, but stocking the pantry with them may not be. We should go back to the philosophy that sweets should be consumed less frequently. It looks like a home-baked cookie made with real sugar is going to turn out to be a whole lot healthier than high-volume consumption of artificially sweetened treats claiming to offer less fat, less sugar, and more taste.

WHAT'S IN MY HOUSE?

We have regular old sugar (white, light brown, and dark brown) and honey in our house. My husband bought a box of Sweet'N Low about five years ago just to have around for guests, but it sits in our pantry untouched. We don't keep sodas at home. I am not as strict as I sound—in fact, my kids are allowed a sweet a day, and I have been known to break that rule and give more. But I would much prefer that treat to be ice cream or a homemade brownie rather than a soda or a candy bar. My kids have no taste for "diet" foods and I hope it stays that way.

Chapter 3

Baby Foods

WHAT IS THE QUESTION?

Around six months of age, a baby is ready to start eating solid foods. Parents with the time and the inclination can make baby foods at home. Fruits and vegetables may be steamed, pureed, and then eaten fresh or frozen into ice cubes for storage in the freezer. But many parents work long hours or don't have easy access to fresh produce. For them, prepackaged baby foods are the only alternative.

Along with feeding your child premade foods comes a lot of guilt. This didn't used to be the case. A generation ago, prepared foods were a welcome relief for parents. These baby foods might not have looked very appetizing, but they were largely considered safe and healthy. Today every consumer item is scrutinized, down to the sixty-nine-cent can of pear puree.

So is it okay to give your child canned food off the shelf? If you do, does it have to be labeled "**organic**"? Are refrigerated purees worth their higher price tags and actually healthier for your child? How can parents navigate the booming industry of baby foods?

WHAT IS THE DATA?

Babies are on all-milk diets (breast milk, formula, or a combination) from birth until they are about five or six months old. Older infants need more calories and are ready to explore the texture of food. These babies