

**SPLENDA IS THE** most popular sugar substitute on the market. It is easily identifiable in the large yellow box or little yellow packets filled with sweet white crystals. The key ingredient in Splenda is sucralose, a non-nutritive artificial sweetener. For volume sake it is combined with fillers including dextrose and maltodextrin. Sucralose is approximately 600 times sweeter than table sugar and yet has zero calories. It is estimated that 65-95 percent of ingested sucralose is not absorbed into the blood stream from the gastrointestinal tract, but rather is excreted in the feces. What could be better than a carb-free, non-calorie sweetener? So far Splenda is sounding pretty good.

In a society whose consumption of sweets and sugar sweetened beverages has been

increasingly associated with the major health problems of our day including obesity, type 2 diabetes, and metabolic syndrome, replacing a 150 calorie soda with a 1 calorie diet soda seems like a good idea. However, does the reduction in calorie consumption from drinking diet drinks translate into lower body weight or improved metabolic health? The short answer is no.

Consider a longer answer based on the observations of the following studies. In the San Antonio Heart Study, weight change in 3,682 men and women was documented over a 7-8 year period. Weight gain and obesity were significantly greater in those consuming artificially sweetened beverages compared with those who did not.

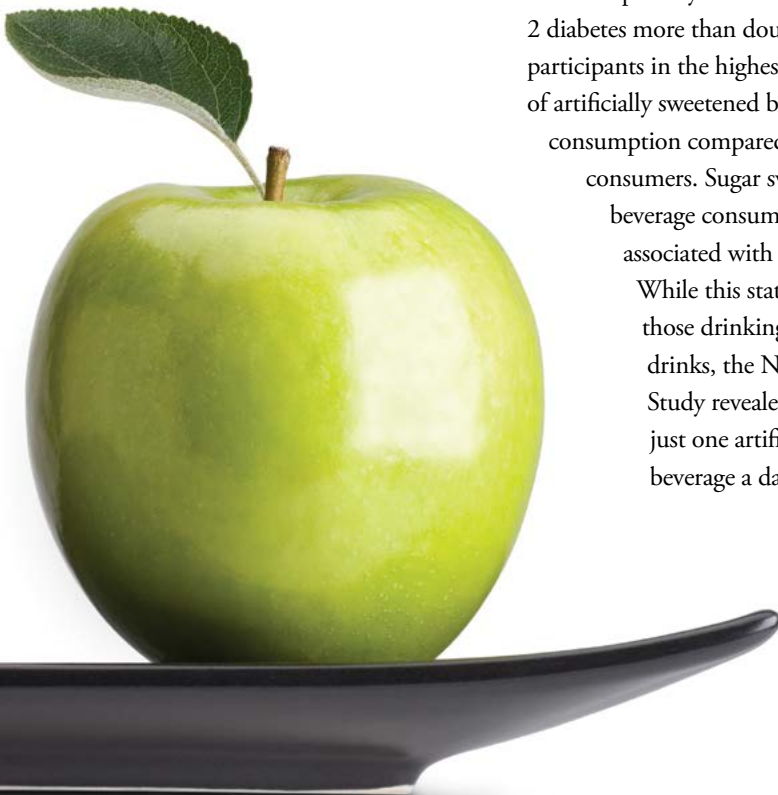
It was observed in the European E3N Study and the Health Professionals Follow-Up Study that risk for type 2 diabetes more than doubled for participants in the highest quartile of artificially sweetened beverage consumption compared with non-consumers. Sugar sweetened beverage consumption was also associated with increased risk.

While this statistic is based on those drinking the most diet drinks, the Nurses' Health Study revealed that drinking just one artificially sweetened beverage a day was associated

with increasing the risk for type 2 diabetes and hypertension. The impact of just one artificially sweetened drink in elevating the risk for type 2 diabetes was also confirmed in the European Prospective Investigation into Cancer and Nutrition (EPIC). The increased risk was "seen even in participants who were normal weight at baseline."<sup>1</sup> Increased risk of developing metabolic syndrome and experiencing cardiovascular events has also been documented in relation to artificially sweetened, as well as sugar sweetened beverages.

Animal studies have produced similar results. Rats and mice receiving sugar substitutes in their diet exhibited greater weight gain and altered physiological responses than rats and mice that received the same diets mixed with sucrose or glucose instead. How could a non-calorie food item have such an impact? One explanation stems from how Splenda affects the microbiome. The microbiome or microbiota is referring to the trillions of microorganisms that populate the gastrointestinal tract, with specific focus on the bowel. The human gut is densely populated with over 1,000 strains of bacteria that significantly impact our health and physiology, playing central roles in regulating multiple physiological processes. There are 10 times more microbes inhabiting us than the number of human cells we are made of. The colon is the most densely populated.

A group of rats were divided into five groups: a control group that



drank plain water and four remaining groups which received Splenda water at increasing concentrations spanning the Accepted Daily Intake (ADI) for humans. For 12 weeks they drank

## WEIGHT GAIN IN THE SPLENDA DRINKING MICE WAS SIGNIFICANT.

their allotted drinks. Their feces were collected and tested throughout this time. At the end of the 12 weeks half of the animals were killed, and their intestines were removed and examined. The remaining rats were taken off all Splenda and given water.

Interestingly, the researchers observed that when rats started drinking Splenda there was an immediate change in the composition of the microbiome. By the end of the 12-week dosing period, at the lowest dose of Splenda, the number of total anaerobes was reduced by 49.8 percent compared to the control group. At the lowest dose the bacterial counts of specific strains: “bifidobacteria, lactobacilli, and *Bacteroides* were reduced by 36.9%, 39.1%, and 67.5% respectively.”<sup>2</sup>

Researchers also observed significant increases in colonic pH. A higher pH means a more alkaline colon, which has been associated with an increased risk of colorectal cancer. Human studies have confirmed that vegans and vegetarians have significantly lower stool pH than controls. More acidic stools are found in those who eat a plant-based diet. Fiber-fermenting bacteria produce organic acids, like lactic acid, which results in an environment in which fiber-eating

bacteria thrive and colon cancer is more effectively resisted.

Weight gain in the Splenda drinking mice was significant. Even after Splenda was discontinued, “there continued to be a significant increase in body weight (17.1%) relative to controls.”<sup>3</sup> Scarring to the epithelium, the inner lining of colon was found as well.

The information we have looked at suggests an intriguing link between consumption of artificially sweetened beverages and negative health outcomes such as glucose metabolism and weight gain. Added to this is the corresponding fact that in none of these prospective studies was artificially sweetened beverage consumption associated with significantly decreased risk of weight gain or development of type 2 diabetes in comparison with sugar sweetened beverages as might be anticipated. Saccharin and aspartame, found in the pink and blue packets, have also been found to modulate the composition and function of the microbiome resulting in weight gain and glucose intolerance. Neither stevia nor monk fruit extract have been found to produce the same effects thus far.

Food is powerful stuff, even if it doesn't have any calories. What we choose to put into our mouths is literally transformative, as we have seen from this one example. Diet and nutritional status are among the most important modifiable determinants of human health. Stated another way, diet decisively affects the outcome of health and it is something we can change and improve to produce a better outcome. This seems pretty straightforward until

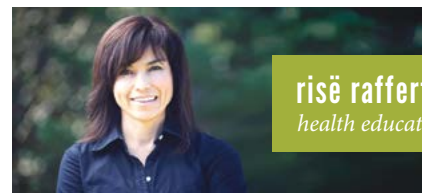
you realize how true the saying is that it is easier to change a person's religion than to change the way they eat. I can't change you or the way you eat. You can't change me. Too often we fight a losing battle of changing ourselves, but we can choose to be changed. “God has given us the power of choice; it is ours to exercise. We cannot change our hearts; we cannot control our thoughts, our impulses, our affections. We cannot make ourselves pure, fit for God's service. But we can *choose* to serve God.”<sup>4</sup> By choosing His power in our lives the promise will be realized, “It is God which worketh in you both to will and to do of His good pleasure” (Philippians 2:13).

<sup>1</sup> Susan Swithers, “Artificial sweeteners produce the counterintuitive effect of inducing metabolic derangements,” *Cell Press, Trends in Endocrinology and Metabolism*, September 2013, Vol. 24, No. 9.

<sup>2</sup> Mohamed B. Abou-Donia, Eman M. El-Masry, et al. “Splenda Alters Gut Microflora and Increases Intestinal P-Glycoprotein and Cytochrome P-450 in Male Rats,” *Journal of Toxicology and Environmental Health*, Volume 71, Issue 21, 2008, p. 1418, <http://www.tandfonline.com/doi/abs/10.1080/15287390802328630?journalCode=uteh20#.VZwxGWb7zS8>.

<sup>3</sup> Ibid.

<sup>4</sup> Ellen White, *Ministry of Healing*, p. 176.



Risë has been writing on various health subjects for over 20 years. She has inspired many through her research and down-to-earth writing and speaking style. She believes that healthy living is intimately tied to happiness and wholeness.