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Nonnutritive Sweeteners and Cancer: Evaluating the Evidence

By Robyn Flipse, MS, MA, RDN



Research to find a cure for cancer is matched only by the efforts to find the cause. Studies have shown that the types and amounts of food eaten over time, or our dietary pattern, can both increase the [risk of certain types of cancer](#) and decrease the risk for others. If individual foods or additives are suspected of causing cancer, they are removed from the food supply when evidence confirms their carcinogenicity. And other factors, such as genetic predisposition and environmental exposures, can influence whether someone will develop cancer regardless of diet.

Establishing the safety of any food, additive, or even drinking water must consider exposure and risk. [Dietary Reference Intakes](#) (DRI) and [Acceptable Daily Intakes](#) (ADI) provide safety thresholds for nutrients and food additives, respectively, by determining the risk associated with their consumption over a lifetime. These are valuable references for registered dietitian nutritionists (RDNs) who want to provide evidence-based answers to questions, such as how much Vitamin A or aspartame can be safely consumed.

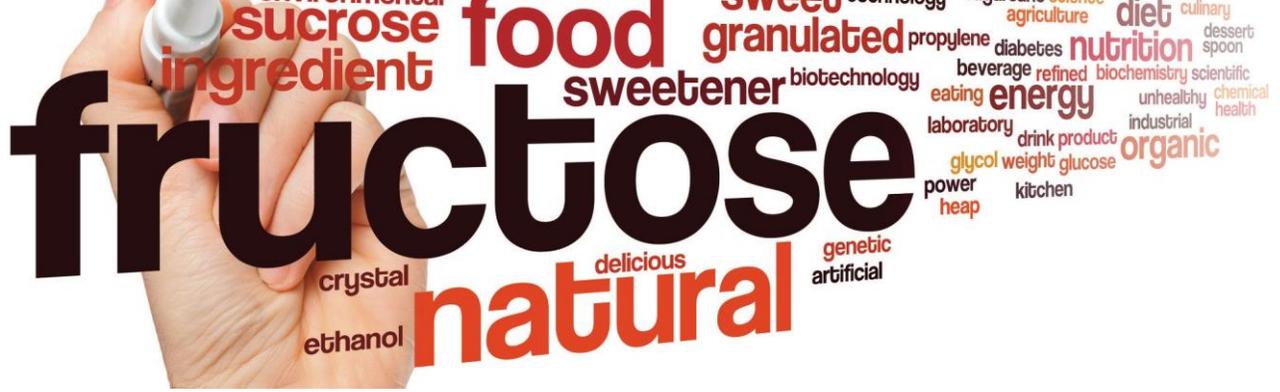
Where does the public get answers to their questions about artificial sweeteners?

If someone asks, “Do artificial sweeteners cause cancer?”, they will get over three million search engine results. The first one in my Google search was from the [National Cancer Institute](#), the federal government’s principle agency for cancer research. The second was from the site of [Dr. Mercola](#), whose mission statement says, in part, to expose government hype that diverts you away from what is truly best for your health. The answers offered by these two sources could not be more opposed. Other articles in my search included one with quotes from “actress and health expert” [Suzanne Somers](#) to those embedded among the recipes on [Delish.com](#).

Is it any wonder the public is confused about the safety of low- and no-calorie sweeteners (LNCS)? Even people who never search for nutrition information online are being influenced by the extreme results found there, and this is a challenge for RDNs and health professionals. According to the International Food Information Council’s [2017 Food & Health Survey](#), consumers feel personal healthcare professionals are more trustworthy than looking online

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about what to eat or not eat, but they turn to family and friends more often to guide their food choices.

What does the science say about low- and no-calorie sweeteners?

Consumers may be confused about the safety of LNCS, but there is no reason for RDNs to be. [Our education](#) in a science-based curriculum prepares us to understand the merits of different types of study design and the interpretation and application of their results. We know we can rely on the findings reported in systematic reviews and meta-analyses to assess whether the amount and quality of evidence on a subject is sufficient to guide client decisions. And as members of the Academy of Nutrition and Dietetics (AND), we can also access the [Evidence Analysis Library](#) to find practice guidelines drawn from completed systematic reviews that answer specific questions based on the quality and extent of the evidence. Our training and these resources allow us to provide the public with consistent, accurate and ethical information within our scope of practice.

So when asked if LNCS cause cancer, one of the first sources we can check is the [Surveillance, Epidemiology, and End Results Program](#) (SEER) of the NCI. It collects, analyzes, interprets and disseminates data on cancer prevalence. Here we can see if the incidence of any type of cancer can be attributed to the worldwide increase in the use of LNCS over the past several decades or to any one of them as an individual sweetener. To date, there is no data to support either query.

The next source is, [“Guidelines on Nutrition and Physical Activity for Cancer Prevention”](#) from the American Cancer Society (ACS) and published in *CA: A Journal for Clinicians*. It states:

“Current evidence does not show a link between these compounds [nonnutritive sweeteners and sugar substitutes] and increased cancer risk. Aspartame, saccharin and sucralose are a few of the nonnutritive, synthetic sweeteners approved for use by the FDA. Current evidence does not demonstrate a link between ingestion of these compounds and increased cancer risk.”

These Guidelines reflect the scientific consensus on cancer prevention from the ACS and are comparable to the [Position Paper: Use of Nutritive and Nonnutritive Sweeteners](#). They are also supported by the [National Cancer Institute](#), [Food and Drug Administration](#), [European Food Safety Authority](#), and many other food safety authorities around the world.

Why all the controversy over low- and no-calorie sweeteners and cancer risk?

Despite the approval of LNCS for use by populations in more than 100 countries, questions about possible cancer risks are still raised. I have two explanations to help you address this with your clients and consumers.

The early [history of saccharin and cyclamate](#), the first two artificial sweeteners widely used in the U.S., is riddled with cancer claims, warning labels, bans, moratoriums and research reversals. When new research proved they posed no cancer threat for humans, only saccharin was reapproved in the U.S. by the FDA, while cyclamate remained banned. It is, however, [approved](#) in 130 other countries. Ever since, suspicions have remained that use of any LNCS might increase cancer risk. This is the result of what I call the “Satan Effect.”

Like the “Health Halo” that imbues foods of questionable nutritional value with a more righteous reputation because of the company they keep, the “Satan Effect” does the opposite. It disparages an otherwise safe food because it is associated with a negative trait and cannot shake the bad reputation, even if undeserved. In the case of LNCS, the effect is reinforced by news outlets that continually exploit any study that finds tumors in lab animals exposed to huge quantities of LNCS, even when the findings cannot be extrapolated to humans, or studies that report associations based on methodology that cannot demonstrate causality. This leads to the second explanation for all the controversy.

All low- and no-calorie sweeteners are not the same

One thing all LNCS sweeteners have in common is their intense sweetening power compared to sugar, but that is where their similarities end. Nine LNCS have been approved for use in the U.S. by the FDA or meet the standards for Generally Recognized As Safe (GRAS) exemptions. They are acesulfame potassium, advantame, allulose*, aspartame, monk fruit extract (GRAS), neotame, saccharin, stevia (GRAS), and sucralose.

As reported in the Special Article, [“Biological fate of low-calorie sweeteners”](#) published in *Nutrition Reviews* in 2016, LNCS do not have the same structures and chemical compositions, are not derived from the same sources, and do not have the same metabolic outcomes or excretion pathways once ingested. Some are digested and indistinguishable from amino acids consumed in any other protein source. Some are not metabolized by humans and excreted unchanged in feces. Others are partially absorbed into the systemic circulation before being excreted in the urine.

These unique features of LNCS are critical, yet are often overlooked in the headlines and tweets that proclaim “artificial sweeteners cause cancer” (or any other disease). As translators of science for the public, our job is to read the studies, or consult with colleagues who have, to get the story right. We need to confirm which LNCS were used, or the product containing them, and not rely on headlines regarding the findings. We must also compare the study design and results to the existing body of research in order to evaluate the impact of new evidence.

A final point worth noting is level of exposure, as discussed earlier in this article. The available LNCS are 200 to 20,000 times sweeter than sugar, which greatly limits the amount found in any product. They are also regularly used in combination with one another, further minimizing the amount of any one likely to be consumed over a lifetime. At present, the [Estimated Daily Intakes](#) for LNCS fall below 10 percent of the Acceptable Daily Intakes, as explained in my article, [“It’s the Dose that Matters.”](#) With market reports showing a steady increase in the number of new LNCS expected to become available over the next 20 years, there is little reason for anyone to be concerned about over exposure to LNCS in the food supply.

Doing what we do best

Knowing that RDNs are one of the most trusted sources of nutrition information in the eyes of the public gives us a valuable opportunity to redirect the conversations surrounding LNCS from those steeped in opinions and inaccuracies to ones based in facts and truth. This effort is greatly enhanced when we are all sharing the same evidence-based information. I hope this article will strengthen your resolve to do just that.

*A low calorie sugar

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About the Author

Robyn Flipse, MS, MA, RDN is a registered dietitian and cultural anthropologist who founded her business, Nutrition Communication Services, so she could share practical nutrition information with people that would empower them to make the best food choices possible in their everyday lives. Her expertise on the history and efficacy of low- and no-calorie sweeteners gave her the opportunity to serve as a scientific advisor to the Calorie Control Council for the past 12 years and it was with their support that she was able to write this article. You can read her blog at www.EverydayRD and follow her tweets @EverydayRD.