

# FREE RADICALS

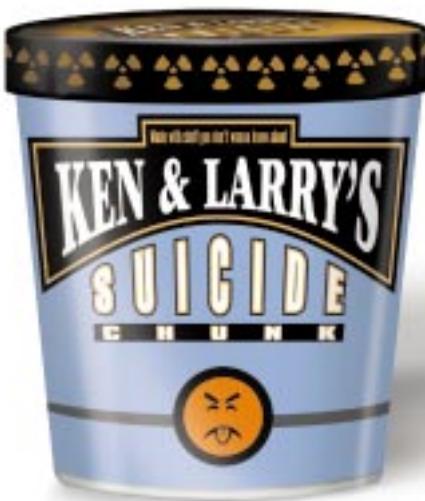
**A**nother reason not to eat dairy products." That's all the message said, followed by the address of a website where I would supposedly learn more. I usually toss out these unsolicited e-mail messages, but this one piqued my interest. I grew up in dairy country, and I like dairy products.

The website contained an article that reported a study of the dioxin levels in ice cream from a well-known ice cream maker, whom I'll call Ken and Larry's to protect the innocent. This was troubling news indeed, because I've downed a few tubs of Ken and Larry's in my time. In fact, one of the great moments of my life occurred when I emerged from the Vermont woods after eight days of backpacking, tired and lusting after any food that was rich and tasty and didn't need to be mixed with water before you could eat it. My first stop was the Ben, er, Ken and Larry's factory store, where I ordered the biggest, chocolate-dipped waffle cone they had, smothered with three flavors of K and L's finest.

As I read the article, a number of things began to trouble me. First, the paper was posted on a website called [junkscience.com](http://junkscience.com), about which I knew nothing, but it wasn't a promising omen. And then there was the experimental methods section, which was one sentence long. It said that the authors bought some ice cream (in the county where I live, no less) and sent it out to an independent lab for analysis. That was it; nothing about the procedures used or the level of precision possible in determining picogram quantities of dioxin. Nothing about how instruments were calibrated or experimental precautions followed. Only one sample was tested.

The study reported that, based on reasonable assumptions of serving size and body weight, a serving of K&L would contain about 190 times the "virtually safe dose." i.e., the exposure associated with one additional case of cancer per million people exposed on a daily basis over their lifetimes, as calculated by the EPA. Then, assuming that the number of cancer deaths would scale linearly with dosage, it was stated that, "This dose rate is 190 times greater than the EPA's VSD, meaning that 190 dioxin-

caused cancers may be expected among every million people who consume that amount of ice cream on a daily basis." The article provides more detail, but you get the idea: Eat lots of ice cream. Die.



## I Scream, You Scream...

by Dale Hall

To make sure that no one was taking any of this too seriously, the authors cited two weaknesses in their study: the aforementioned reliance on one sample and (here it comes) the authors' statement, "we do not believe that credible scientific evidence exists to conclude that dioxin causes cancer in humans." In other words, they disavowed the entire premise of the study and, as a result, their own conclusions.

As you may have guessed by now, this "study" had a purpose other than saving us from the perils of double mocha chocolate chip, namely to suggest that government standards in foods based on calculated but otherwise unsubstantiated perils can be so cautious as to virtually meaningless. I would guess that the authors have no intention of swearing off of ice cream, and I don't either. Unfortunately, this is where some people who had already decided that dairy products are bad for

you entered the picture. Seizing on this tongue-in-cheek study, they began passing the article around to validate their position.

According to a subsequent article on the Detroit News website, the good folks at Ken and Larry's were not amused by the study. That's understandable, given the alarmist spin of the e-mail that came to me. The question that remains for us is, "What can we learn from this?" Certainly, this episode reminds us that anything we say or write in our professional capacities may be read and used by people who either lack understanding or are willing to twist or misuse facts deliberately to support their point of view. This doesn't mean that we shouldn't use parody, sarcasm, satire, or irony to make a point in appropriate forums, but we have to be prepared to see our thoughts and our conclusions twisted as much as 180 degrees, especially on gut-level, emotional issues.

We're also reminded that we don't do a very good job of educating people to think critically and to evaluate information carefully before accepting it and using it. Nor do we teach the general population enough about science and its methods to enable them to recognize suspect or downright bogus science when they see it. Some of the people who passed along the information surely didn't know any better.

Finally, we should realize that, as scientists and engineers, we have the opportunity, perhaps even the obligation, to correct errors and misuses of science when we see them. In a world in which a significant fraction of the population reportedly believes that humans and dinosaurs once cohabited earth, we have a lot of work to do.

One last technical note. The article reports that K&L manufactures 13 million gallons of ice cream per year, amounting to 416 million servings. All I can say, most people must use a smaller scoop than I do. This calls for an experiment; I think there's a little ice cream left in the freezer... ■