THE RIGHT CONTROL DIET

During research projects, unexpected findings often come to light that raise important new questions. Such discoveries cannot always be pursued at the time, and frequently they are not followed up until much later.

In the case of fluoride research, an especially instructive example is an investigation some years ago on a low-fluoride algae and yeast-based diet for rodents that proved to be exceptionally nutritious. Mice bred and raised on this diet through four generations exhibited excellent health and reproductivity as well as an unusually long lifespan compared with mice raised on a standard commercial diet containing "5 to over 20 mg fluoride/kg dry weight."[1] The synthetic diet, with only 0.1 to 0.3 mg F/kg, was derived from a combination of green algae (*Chlorella pyrenoidosa*) grown on analytical-grade mineral salts in distilled water and yeast (*Saccharomyces cerevisiae*) cultured in the spent algae medium with additional salts, vitamins, and sucrose. Finally, it was blended with more sucrose, maize oil, cellulose, and minerals to produce a pellet called "Chlorycel" that was readily accepted and eaten by mice and rats.

Especially noteworthy was how well the animals fared on this diet. Pregnancies in both mice and rats were normal with highly successful rates of weaning. On reaching adult weight, mice raised on Chlorycel "showed no signs of obesity or ill-health, and none of these experimental mice died during the experiment. Five of them were at least 2 years old when they were killed." By contrast, mice raised on the standard laboratory chow "showed a marked tendency to become obese. Their general appearance usually declined after about one year and none survived beyond the age of 15 months."[1]

When Chlorycel was prepared with a low-fluoride calcium supplement, it contained only 0.045-0.060 mg F/kg. An earlier, casein and starch-based rodent diet was estimated to contain an even lower fluoride level of 0.007 mg F/kg, but it was evidently nutritionally defective because "only one-half the [rat] pups were successfully weaned" on it.[2] Other low-fluoride diets[3-6] have also either proved to be inadequate in some respect or were not studied for lifetime exposure.

The inventors of Chlorycel clearly recognized the importance of their discovery, noting that their "very low-fluoride diet ought to make possible a thorough investigation of the vexed question of whether fluorine is an essential trace element." However, they apparently did not pursue further research with Chlorycel, at least none that they have published. The essentiality question is very important and is still debated. But a nutritionally-complete, low-fluoride diet is also invaluable as an ideal tool for investigating the effects of lifetime exposure to fluoride.

At present most chronic fluoride toxicity studies on rodents are conducted with standard commercial diets that contain not only substantial amounts of fluorine but also other toxic elements like aluminum and silicon. Interactions of these elements and combinations of them greatly complicate and compro-

mise the results of long-term fluoride supplementation with such diets. On the other hand, with an optimal low-fluoride diet like Chlorycel, definitive studies can be conducted to determine how fluorides and/or other toxic substances added to it affect the lifespan of mice and rats and at what levels other adverse long-term effects in soft and hard tissues can be detected in these animals. Such a diet is clearly "the right control" that ought to be explored.

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