

**Samuel Zinner, M.D., is Associate Professor of Pediatrics and Coordinator for the Pediatric DBP Resident Rotation at the Center on Human Development & Disability, University of Washington School of Medicine, and Katie Kompoliti, M.D., is Associate Professor of Neurological Sciences at Rush University Medical Center. They are both members of the TSA Medical Advisory Board.**

**I have read that the elimination of sugar and certain food dyes can help people with ADHD. Would it be good for people with TS to reduce or eliminate sugar intake and certain food dyes also? Are there diets that would be particularly advantageous to people with TS?**

The saying “you are what you eat” has held the public’s interest for decades, and certainly also holds quite a bit of truth. We as consumers have become more aware of where our food comes from, although there remains much mystery about the best food choices for our physical and mental health. Since half or more people clinically diagnosed with TS also are diagnosed with ADHD, we’ll examine both conditions here.

### Diet and TS

The possibility that food may affect behavior in people with ADHD came to public attention in 1975 when a pediatric allergist Dr. Benjamin Feingold suggested that some artificial food coloring (AFC) and flavoring, some food preservatives and foods that contain salicylates (which are chemicals that occur naturally in some fruits and vegetables) seemed to adversely affect many children’s behavior. Dr. Feingold suggested that the behavior in about half of children with ADHD improved when removing these ingredients from the child’s diet. The “Feingold diet” as it came to be called did not include elimination of sugar, but the diet does include elimination of some artificial sweeteners.

Separate from the Feingold diet, another line of concern evolved about eating refined sugar and its possible association with ADHD behaviors, due to effects of a rapid rise in blood sugar level as the most popular explanation.

In the years since publication of Dr. Feingold’s initial hypothesis, there have been several research studies that apply the Feingold diet or that eliminate refined sugar. Results from these studies help to clarify possible food-behavior associations.

Regarding the Feingold diet, most studies have not shown an association with ADHD. Some studies have shown a possible, but small, association, although these studies generally have had significant faults in the study design, and in March 2011, a panel of experts brought together by the FDA concluded that the available evidence does not support putting warning labels about risks for ADHD on foods that contain artificial coloring. Most published reviews of available studies agree that there may be a

minority of particularly vulnerable children with ADHD who benefit from the Feingold diet, but that determining which children would benefit is difficult. One reviewer concludes that a trial elimination diet is appropriate for children with ADHD who haven’t shown adequate response to usual treatment approaches or whose parents are interested to pursue the diet.

### Sugar and TS

Reviews of research looking into refined sugars and possible impact on behavior in children with ADHD generally agree that there is no usual association. Two reviews (published in 1995 and in 1996), one that examined 12 studies and another that examined 23 studies, concluded that the evidence does not support an association between sugar and behavior in children with ADHD. However, one review recognizes that a small effect of sugar on behavior is theoretically possible and that it’s not possible to rule out that the behavior of a special subset of children with ADHD could be sensitive to sugar. A 1994 study examined mothers and sons who felt their sons with ADHD were sensitive to sugar. All boys received a sugar substitute, but half of the mothers were deceived, being told that their sons had instead received sugar. All mothers watched their sons on videotape, and those who thought their sons had received sugar reported that their son’s behavior was much more hyperactive after the “sugar” than did mothers who were correctly informed of their sons’ receiving the sugar substitute, suggesting that a parent’s expectation of a sugar-hyperactive association may bias her perception of her child’s behavior.

Unlike ADHD, there is virtually no available research looking at diet impact on TS, so far with just a single published study examining this topic. The 2008 study was a survey completed in Germany offered to patients in a TS clinic and to members of TS self-help groups. The researchers found meaningful associations in the respondents’ perceptions between worsening of tics and consumption of Coke, coffee, black tea, preserving agents, refined white sugar and sweeteners. The authors correctly caution that only double-blind placebo-controlled studies (in contrast to the survey design of their study) are suitable to make a reliable statement regarding efficacy of a treatment’s impact on tics.



### Nutritional Supplements and Diet

A U.S. survey design study in 2004 inquired about nutritional supplements (not diet) and tics. The survey was offered to members of the TSA NY and to a subscription list of a newsletter that explores complementary or alternative medicine treatments for neurological conditions. The researchers reported that nearly 90% of respondents use nutritional supplements to control tics, remarking that it was not possible to relate tic changes to any specific nutritional supplement. The authors correctly caution that the study is not intended to provide evidence of benefit, and they identify several important limitations.

### Conclusion

What to make of these results? While most available research does not associate diet and behavior in ADHD, and while there is no reliable research information regarding diet and tics, a healthful diet is good advice for lots of reasons, whether relating to weight management, diabetes or cancer risks among many others. Parents interested in considering dietary interventions for treating behaviors of ADHD and/or tics should receive accurate information from their health care providers and should consider consultation with a dietitian to ensure balanced good nutrition. ▣

## Donate Online: It’s Safe and It’s Simple

Donating to TSA online is secure and quick. It’s the easiest way to support your favorite TSA programs of education, awareness, research and service. It also permits you to give a gift in honor of a special occasion or in memory of a dear one. Just click on the “Join/Donate” button at the top right hand side of TSA’s homepage and follow the simple prompts.