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Artificial Food Coloring Promotes Hyperactivity

In 1982, the National Institutes of Health found that controlled trials indicated "a *limited* positive association" (emphasis added) between decreased hyperactivity and elimination of artificial food colorings (AFCs) and preservatives from the **diet**. Controversy persists. Most pediatricians do not recommend elimination **diets** for children with **ADHD**.

The authors of this meta-analysis found 15 double-blind, placebo-controlled studies of the effects of tartrazine and other AFCs in 219 subjects younger than 18 years who met the diagnostic criteria for hyperactivity. A second meta-analysis examined eight additional studies that evaluated whether AFCs provoked hyperactivity in 132 nonhyperactive children. Subjects in these analyses had mean ages of 7.9 and 7.3 years, respectively. Effect size (ES) was calculated using a standardized mean difference in hyperactive behavior with and without AFCs.

The authors found an overall ES of AFCs on hyperactivity of 0.28; the finding remained significant when the smallest and lowest-quality trials were excluded (ES=0.21). AFCs had one third to one half the ES that stimulant medications had in trials in children with **ADHD**. Studies that screened for responsiveness (for example, through parental reports) showed the greatest effects (ES=0.32).

Comment: These comprehensive meta-analyses demonstrated a modest association between AFCs and hyperactivity in children. The greatest effects occurred in children screened for response before study entry, so parental reports of AFC-induced or -exacerbated hyperactivity may be important. The biologic effects of AFCs need more research -- do AFCs produce an allergic reaction, or do behavioral manifestations reflect a pharmacologic mechanism? I remain cautious in recommending elimination of AFCs for hyperactive children. Most children with **ADHD** will not respond, and restrictive **diets** may further stress children and families. On the other hand, when a parent reports decreased hyperactivity/irritability after limiting AFCs, a trial seems reasonable. Certainly, there is no nutritional benefit to tartrazine and related color additives!

— *Martin T. Stein, MD*

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Schab DW and Trinh NH. *Do artificial food colors promote hyperactivity in children with hyperactive syndromes? A meta-analysis of double-blind placebo-controlled trials. J Dev Behav Pediatr* 2004 Dec; 25:423-34.

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