June 3, 2008

UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES
FOOD AND DRUG ADMINISTRATION

Petition to Ban the Use of Yellow 5 and
Other Food Dyes, in the Interim to
Require a Warning on Foods Containing These
Dyes, to Correct the Information the
Food and Drug Administration Gives to Consumers
On the Impact of These Dyes on the Behavior of
Some Children, and to Require Neurotoxicity
Testing of New Food Additives and Food Colors.

Docket No. _____

submitted by the

CENTER FOR SCIENCE IN THE PUBLIC INTEREST

June 3, 2008

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This petition is dedicated to the late Dr. Ben Feingold, whose astute clinical observations and relentless advocacy helped thousands of parents protect their children from the neurotoxic effects of food dyes and other food ingredients.

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Dockets Management Division
Food and Drug Administration
Room 1061 (HFA-305)
5630 Fishers Lane
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CITIZEN PETITION

I. Preliminary Statement

About 3 to 10 percent of school-age children in the United States suffer from hyperactivity, attention-deficit/hyperactivity disorder ("ADHD"), or related behavioral problems.[1] In the early 1970s, Dr. Ben Feingold popularized a dietary treatment that appeared to reduce symptoms of hyperactivity in many children.[2] The prescribed diet lacked synthetic food dyes, artificial flavorings, and foods believed to contain salicylates (it also excluded aspirin). As discussed below, numerous scientific studies have provided at least partial substantiation of what became known as the "Feingold Diet." Those studies show that in some children behavioral problems[3] are exacerbated by Yellow 5 and other synthetic food dyes.[4,5]

It is medically and ethically unwise to burden hyperactive children and their parents with concerns about foods with synthetic dyes. After all, parents (and pediatricians) first would have to know about the potential risk and then figure out if their children were adversely affected by dyes. Then they would have to protect their children from packaged and restaurant foods with dyes and from dyed foods served at friends' parties, school events, picnics, and elsewhere. Parents (and children) should not be burdened with having to fend off the almost ubiquitous risks (see Appendix 1). The appropriate public health approach is to remove those dangerous and unnecessary substances from the food supply. Food manufacturers voluntarily could substitute safe natural colors or other ingredients (such as fruit or fruit juices) for dyes, but that's unlikely to happen throughout the food supply without the level playing field provided by government regulation.[6] Accordingly, the Food and Drug Administration ("FDA") should ban the use of dyes in all foods; until such action takes effect, the FDA should require a prominent warning notice on product labels.[7]

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[1] Schab D, Trinh N. 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;25:423-34 at 423.
[2] See web site of the Feingold Association of the United States: www.feingold.org/aboutFAUS.html (accessed April 27, 2008).
[3] We use the term "behavioral problems" to include ADHD, hyperactivity, Attention-Deficit disorder (ADD), impulsivity, irritability, interference with learning, and various other behavior disorders, as assessed in the studies. Food colorings are not the sole cause of ADHD and hyperactivity.
[4] Schab D, Trinh N. 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;25:423-34 at 431.
[5] We generally use the terms food dyes and artificial colorings interchangeably to refer to synthetic dyes.
[6] In the 30 years since the diet–behavior link was first hypothesized, major companies have not voluntarily removed dyes from their products.
[7] Artificial colorings have not been tested for behavioral effects in adults, and natural colorings have not been tested

II. Action Requested

The FDA divides 40 approved food colors into two categories: nine synthetic dyes that are subject to FDA certification and 31 colorings that are not (the latter are derived from minerals, plants, or insects). [8] It is only the certified food dyes that are suspected of adversely affecting children's behavior and that are the subject of this petition.

The Center for Science in the Public Interest[9] ("CSPI") requests[10] that the FDA immediately initiate a rulemaking to revoke the approvals of the following eight synthetic food dyes: FD&C Blue No. 1, 21 C.F.R. 74.101; FD&C Blue No. 2, 21 C.F.R. 102; FD&C Green No. 3, 21 C.F.R. 203; Orange B, 21 C.F.R. 74.250; FD&C Red. No. 3, 21 C.F.R. 74.303; FD&C Red. No. 40, 21 C.F.R. 74.340; FD&C Yellow No. 5, 21 C.F.R. 74.705; FD&C Yellow No. 6, 21 C.F.R. 74.406.[11] Considering the onerous, time-consuming steps that the color additives law (section 721 of the Federal Food, Drug, and Cosmetics Act ["FFDCA"]) stipulates, it is clear that banning all those dyes would take a very long time. Hence, as an interim measure, we ask that foods containing synthetic food dyes be required to bear a warning notice, such as: "WARNING: The artificial colorings in this food cause hyperactivity and behavioral problems in some children," on the principal display panels.

In addition, we ask that the FDA correct statements made in its public information about dyes and behavior. The FDA now tells visitors to its web site that there is "no evidence that food color additives cause hyperactivity or learning disabilities in children."[12] We request that the FDA correct that guidance.[13]

Elsewhere on its web site, the FDA states: "A Consensus Development Panel of the

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for behavioral effects in children or adults.

[8] CSPI has long been concerned about the safety of food colorings. In the 1970s, we communicated with the FDA regarding Red No. 40 and the now-banned Violet No. 1. With regard to a natural coloring, in response to a petition submitted by CSPI in August 1998, the FDA proposed in 2006 to require that food and cosmetic products containing cochineal extract or carmine declare that fact on their labels because they cause an allergic reaction in some people. 71 Fed. Reg. 4839 (January 30, 2006). Those colors come from insects.

[9] CSPI, based in Washington, D.C., is supported largely by 900,000 members in the United States and Canada who subscribe to its Nutrition Action Healthletter. CSPI has been working to improve the nation's health through better nutrition and safer food since 1971.

[10] This petition is submitted pursuant to section 4(e) of the Administrative Procedure Act, 5 U.S.C. 553(e), and 21 C.F.R. 10.25 and 10.30.

[11] Another dye, Citrus Red 2, is used in only small amounts on the peels of oranges and poses a negligible risk to children.

[12] Food Color Facts (Center for Food Safety and Applied Nutrition 1993) www.cfsan.fda.gov/~lrd/colorfac.html (accessed January 18, 2008).

[13] Commenting on a similar FDA statement, University of Rochester School of Medicine and Dentistry researcher Bernard Weiss states, "This is a rather baffling statement. In fact, my own study (Weiss 1982) was funded by the FDA, and its results, along with a number of others from that period, definitively demonstrated adverse behavioral effects of synthetic food colors. During the intervening years, with a plethora of confirmations, the FDA has remained blindly obstinate. It continues to shield food additives from testing for neurotoxicity and apparently believes that adverse behavioral responses are not an expression of toxicity." Weiss B. Food additives and hyperactivity. Environ Health Perspect. 2008;116(6)June.

National Institutes of Health concluded in 1982 that there was no scientific evidence to support the claim that colorings or other food additives cause hyperactivity."[14] In fact, that panel acknowledged that "Studies also indicated that some hyperactive children on a defined diet experience an increase in hyperactivity when given moderate doses of artificial food dyes, and did not experience similar increases after receiving a placebo."[15] The FDA's web site also states: "The [NIH] panel said that elimination diets should not be used universally to treat childhood hyperactivity, since there is no scientific evidence to predict which children may benefit." In fact, the NIH panel stated: "However, the panel recognizes that initiation of a trial of dietary treatment or continuation of a diet in patients whose families and physicians perceive benefits, may be warranted." We ask that the relevant sections of FDA's web site be removed or revised to reflect the evidence from many studies that diet *can* affect behavior.

Finally, in recognition of the ability of food dyes, and possibly other ingredients, to have neurotoxic effects, we ask the FDA to add to its recommended protocols for testing new food ingredients[16] tests for neurotoxicity, as some have urged for more than a quarter-century.[17] We note that such common additives as aspartame[18] and monosodium glutamate[19] may have neurotoxic effects in some individuals.

III. Numerous Scientific Studies Show that Yellow 5 and Other Food Dyes Can Adversely Affect the Behavior of Some Children.

The publicity that Feingold generated in the mid-1970s on the basis of his clinical practice spurred scientific research on diet, including dyes, and behavior. As early as 1982, behavioral toxicologist Bernard Weiss concluded that "The total evidence, although not wholly consistent, nevertheless suggests that [the Feingold] hypothesis is, in principle, correct."[20] In 1999, CSPI published a critical review on "Diet, ADHD, and Behavior: a quarter-century

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[14] Color additives. Do color additives in food cause hyperactivity? www.cfsan.fda.gov/~dms/qa-topad.html (accessed March 18, 2008).

[15] National Institutes of Health Consensus Development Conference Summary. Defined Diets and Childhood Hyperactivity. Vol 4, No. 3. (Government Printing Office 890-228). NIH held a broader consensus conference on November 16-18, 1998, on the diagnosis and treatment of ADHD. The treatment portion of that conference focused almost entirely on pharmaceuticals, with dietary treatment only an afterthought. The report noted that "Some of the dietary elimination strategies showed intriguing results suggesting the need for future research." However, reflecting the conferees' apparent limited interest in the topic, the lengthy list of recommended research topics did not mention diet at all. (NIH Consensus Statement. Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder (ADHD). Nov. 18, 1998. Vol. 16, No. 2.)

[16] Agency Review of Toxicology Information in Petitions for Direct Food Additives and Color Additives Used in Food, www.cfsan.fda.gov/~acrobat/rediiabc.pdf (accessed March 18, 2008).

[17] Weiss B. Food additives and environmental chemicals as sources of childhood behavior disorders. J Am Acad Child Psychiatry. 1982;21:144-52.

[18] Lipton RB, Newman LC, Cohen JS, Solomon S. Aspartame as a dietary trigger of headache. Headache. 1989;29(2):90-2.

[19] See review in: Fernstrom JD. "Health issues relating to monosodium glutamate use in the diet" *in* Kilcast D, Angus F. Reducing Salt in Foods: practical strategies (Boca Raton:CRC Press, 2007).

[20] Weiss B. Food additives and environmental chemicals as sources of childhood behavior disorders. J Am Acad Child Psychiatry. 1982;21(2):144-52.

review" (see Attachment 1). That review discusses more than 20 controlled studies on diet and behavior, including research involving food dyes, and concludes that the weight of the evidence demonstrates that modest doses of dyes, or mixtures of dyes, adversely affect the behavior of some children.[21] Some of the studies that found effects of food dyes include the following (additional studies, both positive and negative, are discussed in CSPI's review):

- Conners, one of the leading, early researchers on food ingredients and behavior, and his colleagues conducted several studies in which children were challenged with food dyes. One study placed 16 children between four and 11 years old and diagnosed with hyperactivity on a "modified Feingold diet" from which only dyes were eliminated."[22] That diet, introduced openly, appeared to reduce behavior problems by 34 percent (as rated by teachers) or 57 percent (as rated by parents). The researchers then challenged, in a double-blind fashion, the children with cookies that contained or lacked a mixture of food dyes (26 milligrams [mg] per day). Parents and teachers did not identify any effect, but three of the children (six and seven years old) showed "a marked deterioration of performance" in an objective visual-motor attention task. The three children were affected only at about one hour after eating a cookie. The parents' and teachers' failure to discern when children were consuming the dye, the authors conjectured, might have been because they rated the children not at the one-hour point, but only at the end of the day. Also, Conners suggested that several subjects dropped out of the study because of severe reactions to the dyes.

- Another study by Conners and colleagues tested 13 children between the ages of three and nine, including eight children who were diagnosed as hyperactive and five who were considered borderline hyperactive.[23,24] When put on a dye-free diet (not double-blind) for several weeks, the subjects demonstrated a 41-percent reduction in behavior problems, with 77 percent of the children appearing to respond. The children then, in a double-blind study, ate two cookies made with or without dyes (13 mg each, one after breakfast, the other after dinner) for one week each. Parents rated their children's behavior for a three-hour period after dinner. For the group as a whole, the children exhibited significantly more behavioral problems after they ate the dye-containing cookies. Four children (31 percent) displayed marked reactions. One girl was retested twice and showed repeated reactions to colors. The authors concluded, "These data firmly establish that artificial colors may be particularly disruptive to younger children and that it will be important to ... examine the possible mechanisms whereby these chemicals act on the CNS [central nervous system]."

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[21] Following receipt of CSPI's report, the FDA told CSPI that the FDA was "not aware of any definitive research establishing a causal relationship between diet or food ingredients, including color additives, and ADHD." (Letter from Commissioner Jane Henney, Dec. 23, 1999.)

[22] Conners CK. *Food Additives and Hyperactive Children*. (New York: Plenum Press, 1980), pp. 45-54.

[23] Conners CK. *Food Additives and Hyperactive Children*. (New York: Plenum Press, 1980), pp.55-68.

[24] Goyette CH, Conners CK, Petti TA, Curtis LE. Effects of Artificial Colors on Hyperkinetic Children: A Double-Blind Challenge Study. Psychopharmacol Bull. 1978;14:39-40.

- In a study sponsored by the FDA, 22 children were kept on a diet free of artificial colors, flavors, and certain other additives and foods and then covertly challenged with dyes on certain days.[25] (The subjects had not been diagnosed as hyperactive, but were suspected by their parents of having behavioral reactions to artificial colorings or flavorings and had been kept on some sort of restricted diet). For 77 consecutive days, each child drank a specially prepared beverage. On eight randomly selected days, the drink concealed a mixture of seven dyes (35.3 mg). Two subjects showed clear reactions, according to their parents. A 34-month-old girl "reacted dramatically" on the days she received the dyes. A three-year-old boy displayed convincing evidence of sensitivity to the color challenge for behaviors his mother considered typical of his outbursts. "These data further strengthen the accumulating evidence from controlled trials, supplemented by laboratory experiments, that modest doses of synthetic colors, and perhaps other agents excluded by elimination diets, can provoke disturbed behavior in children," the researchers stated.

- In one of the few studies using relatively high doses of dyes, researchers challenged 40 children, half of whom were considered hyperactive based on their responsiveness to stimulant medications.[26] The other children responded adversely to those drugs and were presumed not to be hyperactive. After being put on a "Feingold Diet"—free of dyes, artificial flavors, BHT, BHA, and natural sources of salicylates (such as apples and tomatoes)—for three days, the children were challenged on one day with a mixture of dyes and on another day with a placebo. Using a double-blind protocol, the researchers tested doses of 100 mg and 150 mg (the latter estimated by the FDA to be the 90th-percentile intake). Compared to the placebo, the dyes decreased the attention span of the hyperactive children, but not the other children. Seventeen of the 20 hyperactive subjects suffered impaired performance in a learning test. The authors suggested that negative results in some of the previous studies were due to the use of doses of dyes that were too low.

- Another study using a large dose of a mixture of dyes, tested 19 children between three and 15 years old.[27] According to their parents, the children exhibited poor concentration, excessive fidgeting, and other behavioral problems after consuming foods that contained dyes. For that reason the children were put on restricted diets. During the (double-blind) study, the children were kept on their restricted diets. Every day for seven weeks, the children consumed a gelatin capsule with their breakfast. During two of those weeks the capsules contained 125 mg of a mixture of four food colors, including tartrazine (Yellow 5), sunset yellow (Yellow 6), carmoisine (not used in the United States), and amaranth (Red 2, now banned in the United States).[28] During the other weeks the capsules

[25] Weiss B, Williams JH, Margen S, et al. Behavioral responses to artificial food colors. Science. 1980;207:1487-8.
[26] Swanson JM, Kinsbourne M. Food dyes impair performance of hyperactive children on a laboratory learning test. Science. 1980;207:1485-7.
[27] Pollock I, Warner JO. Effect of artificial food colours on childhood behaviour. Archives of Disease in Childhood. 1990;65:74-7.
[28] Studies done abroad did not use dyes certified by the FDA. Nonetheless, we use the FD&C nomenclature interchangeably with the generic names of the dyes.

contained a lactose placebo. Seventeen of 19 sets of parents rated their children's behavior as worse—in several cases sharply worse—when their children consumed the food colors.

- A 1978 study tested 26 schoolchildren who had been diagnosed with ADHD and had been taking stimulant drugs.[29] The children were put on a diet free of artificial colors and flavors, though at least seven of the children "cheated." Then, in a double-blind study using a 2 x 2 factorial design, the children were challenged on separate days with chocolate cookies containing or lacking a mixture of food dyes (26 mg per day) in the presence or absence of their medications. The children's teachers observed "clearly significant reductions [in hyperactive behavior] related to diet for approximately one-fourth [3 to 8] of the children." A detailed reanalysis by Weiss found that one child responded "sharply and consistently."[30]

In 2004, Schab and Trinh published a meta-analysis of studies on dyes and behavior. [31] Their study identified 427 non-duplicative studies on the link between diet and behavior. From that body of literature, they identified 21 double-blind, placebo-controlled studies on the impact of artificial food colorings. Fifteen of those studies included children clinically diagnosed with hyperactivity. Four of the 15 studies focused on Yellow 5, one evaluated both Yellow 5 and Yellow 6 individually, and the other ten used various mixtures of artificial colors.[32] Yellow 5 and Yellow 6 are the second- and third-most-widely used dyes in the United States.[33] After examining such factors as sample size,[34] Schab and Trinh concluded that the effect of dyes on children was statistically significant, particularly with regard to parents' ratings.

Schab and Trinh also analyzed eight studies, or subsets of studies, that included non-hyperactive children or heterogeneous groups of children that were primarily non-hyperactive. Two of those studies used Yellow 5, one tested both Yellow 5 and carmoisine, and five used mixtures of dyes. The investigators found that the dyes impaired the behavior of children who were suspected of being responsive to such colors prior to entering the blinded trial. Figures 1–4 of their paper show that several studies showed statistically significant adverse effects of dyes on behavior, and none showed a statistically significant benefit.[35] The authors provided several

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[29] Williams JI, Cram DM, Tausig FT, et al. Relative effects of drugs and diet on hyperactive behaviors: an experimental study. Pediatrics. 1978;61:811-7.

[30] Weiss B. Food additives and environmental chemicals as sources of childhood behavioral disorders. J Am Acad Child Psychiatry. 1982;21:144-52.

[31] Schab D, Trinh N. 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;25:423-34 at 425.

[32] For example, one study that found diet could reduce symptoms in some children used a mixture of nine artificial colors (Red 2, 3, and 4; Blue 1 and 2, Yellow 5 and 6; Green 3; and Orange B). Williams J, Cram D, et al. Relative Effects of Drugs and Diet on Hyperactive Behaviors: An Experimental Study. Pediatrics 1978;6:811-7.

[33] Color Certification Reports. Center for Food Safety and Applied Nutrition. www.cfsan.fda.gov/~dms/col-cert.html (accessed March 13, 2008).

[34] For example, one study that found no impact involved a single child. Mattes J, Gittelman-Klein R, A Crossover-Study of Artificial Food Colors in a Hyperkinetic Child. Am J Psychiatry 1978;135:987-8.

[35] Schab D, Trinh N. Do Artificial Food Colors Promote Hyperactivity in Children with Hyperactive Syndromes? A

reasons why their results might have been different from that of a 1982 meta-analysis,[36] which found no impact of dyes on behavior. Among them, the 1982 meta-analysis considered the effect of the "Feingold Diet" and not just food dyes, did not include two large trials that were published subsequently, overlooked two studies included in the 2004 review, and used less-sophisticated statistical methods.[37] Schab and Trinh concluded that dyes "promote hyperactivity in hyperactive children, as measured on behavioral rating scales" and that "society should engage in a broader discussion about whether the aesthetic and commercial rationale for the use of [artificial food colorings] is justified."[38]

Weiss's trenchant 1982 review highlighted weaknesses of design (such as dosage, assessments done at inappropriate times, etc.) and analysis in previous studies.[39] For instance, he reanalyzed the original data of several studies and discovered that group averages that did not indicate behavior change sometimes obscured the fact that individual children reacted significantly to dyes:

> Conventional statistical tests are inappropriate here….If only a proportion of [subjects] are potential responders, their data may be buried by group statistics….If only 30% of a sample are responders, and they shift by an average of one standard deviation, the total sample average shifts only minutely. Investigators need to be sensitive to these problems.

Subsequent to the Schab–Trinh meta-analysis, the British Food Standards Agency ("FSA") funded two randomized, double-blind, placebo-controlled trials by Southampton University researchers to test whether food dyes (and a preservative) affect childhood behavior. Importantly, unlike most previous studies, these studies involved children from the general British population, rather than children who were diagnosed as hyperactive or suspected of being affected by dyes and other food ingredients.

- The first study tested the effects of 20 mg of a mixture of four dyes (two of which are used in the United States)[40] and 25 mg of sodium benzoate (a widely used preservative) on 277 three-year-old children. Parents, but not clinical testing, detected statistically significant benefits during weeks in which children were not exposed to the chemicals and deterioration during weeks in which children were exposed.[41]

Meta-Analysis of Double-Blind Placebo-Controlled Trials. J Dev Behav Pediatr. 2004;25:423-34 at 427-8.

[36] Kavale KA, Forness SR. Hyperactivity and diet treatment: a metaanalysis of the Feingold hypothesis. J Learn Disabil. 1983;16:324–30.

[37] Schab D, Trinh N. 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;25:423-34 at 428.

[38] Schab D, Trinh N. 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;25:423-34 at 428 and 431.

[39] Weiss B. Food additives and environmental chemicals as sources of childhood behavior disorders. J Am Acad Child Psychiatry. 1982;21:144-52 at 147, 150.

[40] Sunset yellow (used in the United States as Yellow 6), tartrazine (used in the United States as Yellow 5), carmoisine, ponceau 4R.

[41] Bateman B, Warner JO, Hutchinson E, et al. The effects of a double blind, placebo controlled, artificial food colourings and benzoate preservative challenge on hyperactivity in a general population sample of preschool children. Archives of Disease in Childhood. 2004;89:506-11.

- In the second study, the authors tested two mixtures of four food dyes (20 mg in Mixture A and 30 mg in Mixture B) and sodium benzoate (45 mg in both mixtures)[42] on 3-year-olds and 8- and 9-year-olds. In the younger children, Mixture A had an adverse effect, but Mixture B only showed a trend that was not statistically significant. In the older children who adhered well to the protocol, both mixtures had adverse effects. The authors concluded that "artificial colors or a sodium benzoate preservative (or both) in the diet result in increased hyperactivity in 3-year old and 8/9 year-old children in the general population….The implications of these results for the regulation of food additive use could be substantial."[43]

A European Food Safety Authority ("EFSA") review concluded that the two British studies provided "limited evidence that the two different mixtures of synthetic colours and sodium benzoate tested had a small and statistically significant effect on activity and attention in children selected from the general population."[44] However, EFSA downplayed the significance of the findings. The authors of the Southampton studies wrote a detailed rebuttal of EFSA's review.[45] (See Appendix 2 for CSPI's assessment of the Southampton studies.) We note again that, in contrast to most previous studies, the subjects in this study represented a cross-section of the population and not children who had ADHD or were thought by their parents to be sensitive to dyes. Also, the British researchers averaged the ratings of all the children, rather than considering each child as an individual experiment. Thus, the non-responders (probably a majority of the children) may have largely obscured sharp reactions to dyes in a subgroup of children.

Some of the studies that have been conducted used doses of dyes lower than what the average child is likely to consume and far lower than what heavy consumers of dyes are likely to consume. Several of the studies used doses of 26 mg or less per day, which was thought several decades ago to be about the average amount consumed by children. Obviously, many individuals consumed far more dye than the average. Furthermore, in 1976 an FDA scientist estimated that 10 percent of children between one and five years old consumed more than 121 mg of dyes per day, and 10 percent of children between six and 11 years old consume 146 mg or more.[46] The average level might have been as high as 76 mg—not 26 mg—and the maximum as

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[42] Mixture A contained sunset yellow, carmoisine, tartrazine, and ponceau 4R; Mixture B replaced the last two colors with quinoline yellow and allura red. Carmoisine, ponceau 4R, and quinoline yellow are not approved for use in food in the United States although their use is permitted in the United Kingdom; the other three colors are approved by the FDA as Yellow 6, Yellow 5, and Red 40.

[43] McCann D, Barrett A, Cooper A et al. Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomized, double-blinded, placebo-controlled trial. Lancet. 2007(Nov 3);370:1560-7.

[44] The EFSA Journal. 2008;660:1-54.

[45] See Annex 3 of FSA's statement on Food Additives and Hyperactivity, April 10, 2008. www.food.gov.uk/multimedia/pdfs/board/fsa080404a.pdf (accessed April 10, 2008).

[46] Memorandum from a nutritionist, Department of Health, Education, and Welfare, Division of Consumer Studies, to T. J. Sobotka, Biochemical Toxicology Branch, Food and Drug Administration, July 30, 1976. Cited in Swanson JM, Kinsbourne M. Food dyes impair performance of hyperactive children on a laboratory learning test. Science.

high as 315 mg per day. Those figures suggest that many studies used dosages of dyes inadequate to elicit the behavioral effects that some children's ordinary diets triggered. Indeed, Conners, who used a challenge dose of 26 mg in one study, later regretted using so little: "Unfortunately, we accepted the recommendations of the interagency collaborative group of the National Institute of Mental Health to employ a double-blind challenge material supplied by the Nutrition Foundation. The figure of 15 mg of artificial colors recommended by that group as half the average daily intake of colors by adults may, in retrospect, be a considerable underestimation."[47] In contrast, two of the studies that challenged children with 100 mg or more of dye per day found effects in comparatively large percentages of children.[48] That amount is not unreasonable given the large amounts of food dyes in commonly eaten products (see table below).

In considering the dosages of dyes used in various studies, it is noteworthy that the quantities of dyes being certified for use have been increasing steadily. The average per capita amounts rose from 12 mg per day in 1955 to 32 mg per day in 1975, 47 mg per day in 1998, and 59 mg per day (or about 22 grams per year) in 2007, a five-fold increase over five decades (see graph below).[49] While true consumption figures are not known, current amounts of dyes certified for use in the United States suggest that the amounts now being consumed are greater than what was used in most studies. The increased exposure to dyes may be causing higher rates of behavioral disturbances.[50] (It is noteworthy that while dye certification increased by 84 percent between 1975 and 2007, calorie availability increased by only 26 percent between 1975 and 2005.[51] Thus, dye availability has been increasing at more than three times the rate of calorie availability.)

1980;207:1485-7.

[47] Conners CK, Goyette CH, Newman EB. Dose-time effect of artificial colors on hyperactive children. J Learning Disabilities. 1980;13(9):48-52.

[48] Pollock I, Warner JO. Effect of artificial food colours on childhood behaviour. Archives of Disease in Childhood. 1990;65:74-7. Swanson JM, Kinsbourne M. Food dyes impair performance of hyperactive children on a laboratory learning test. Science. 1980;207:1485-7.

[49] Calculations by CSPI based on FDA data on certification of straight dyes and lakes (adjusted for weight of dyes) and current U.S. population. Color Certification Reports. Center for Food Safety and Applied Nutrition. www.cfsan.fda.gov/~dms/col-cert.html (accessed March 13, 2008). Consumers are also exposed to about another 4 percent of dyes approved only for use in drugs and cosmetics (D&C colors).

[50] The National Institute of Mental Health estimates that between 3 and 5 percent of children have ADHD, or approximately 2 million children in the United States. www.nimh.nih.gov/health/publications/adhd/complete-publication.shtml (accessed May 30, 2008). The annual production quota for Ritalin soared from 2,000 kg in 1990 to 15,000kg in 2000. www.usdoj.gov/dea/pubs/cngrtest/ct051600.htm#fig1 (accessed, May 30, 2008). In recent years, other stimulant drugs and non-stimulant drugs have become popular in treatment of behavioral disorders.

[51] Economic Research Service, U.S. Department of Agriculture. Average daily per capita availability of calories, adjusted for spoilage and other waste. www.ers.usda.gov/Data/FoodConsumption/spreadsheets/foodloss/Calories.xls#Totals!a1 (accessed May 17, 2008).

Amounts of Food Dyes in Typical Foods

	RACC*	Range of Dye Content (mg per RACC)
Candy and confections		
Mini hard candy	5g	0.05 – 2.00
Other hard candies, baking candies	15g	0.15 – 6.00
Beverages	240ml	1.20 – 48.0
Dessert powders	21.4g	0.11 – 12.9
Cereals	30g	6.00 – 15.0
Bakery goods		
heavy cakes, pies, fruit crisps	125g	1.25 – 62.5
coffee cakes, donuts, sweet rolls, muffins	55g	0.55 – 27.5
granola bars, breakfast bars	40g	0.40 – 20.0
cookies	30g	0.30 – 15.0
Ice creams	66g	0.66 – 13.2
Snack foods	30g	0.75 – 15.0

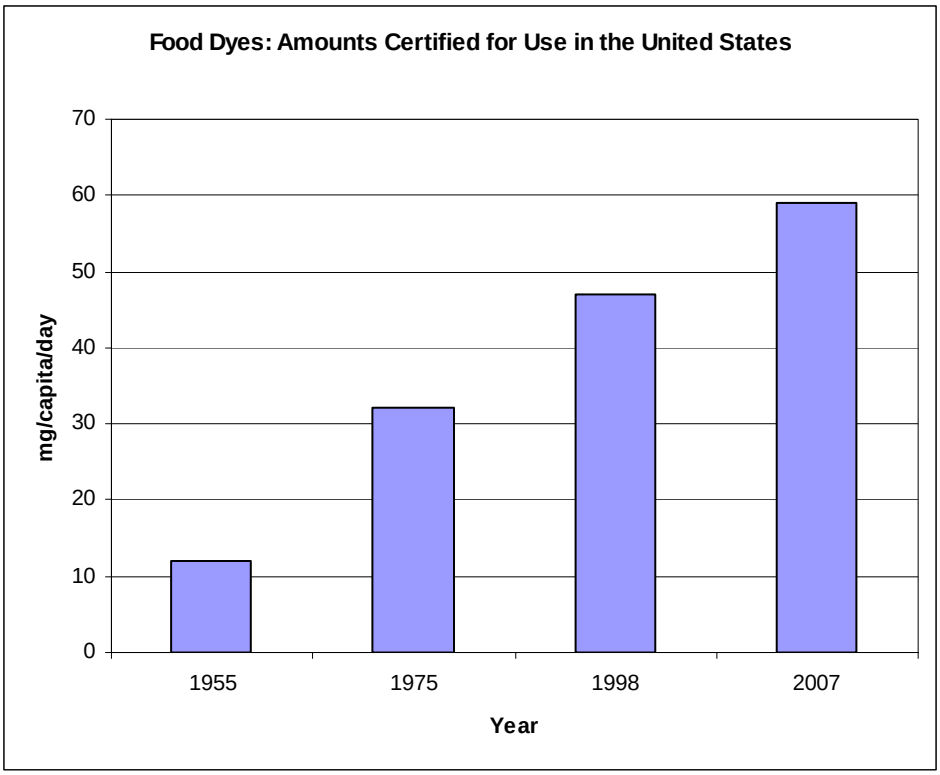
* Reference amounts customarily consumed per eating occasion, as defined by FDA.

CSPI calculations based on coloring levels reported in Marmion D. *Handbook of U.S. Colorants* (New Jersey: Wiley InsterScience, 1991). The levels Marmion cites were apparently originally published in Certified Color Industry Committee. Food Technol. 1968;22(8):14.

We also note that the FDA normally requires acceptable daily intakes of food additives to be based on the highest no-observed-effect level in animal or human studies, divided by an appropriate safety factor.[52] The tests of dyes on children did not include exaggerated amounts of dyes to help compensate for the small numbers of subjects and the fact that some children could be more sensitive than any of the subjects participating in the small studies. Also, almost all studies used smaller doses of dyes than appear to be consumed by Americans today. Studies

[52] See, for example, Agency Review of Toxicology Information in Petitions for Direct Food Additives and Color Additives Used in Food, www.cfsan.fda.gov/~acrobat/rediiabc.pdf (accessed March 18, 2008).

have not identified a no-effect level, and on that basis alone dyes should be banned. Applying a 10-fold safety factor to the lowest-effect levels would indicate even more strongly the appropriateness of a ban.



Most of the studies of dyes and behavior used mixtures of up to nine dyes. The advantages of that approach are (a) that most artificially colored foods contain two or more dyes (see Appendix 1) and (b) colorings might have synergistic effects with one another or with other additives, as has been demonstrated in one *in vitro* study.[53] However, for regulatory agency action, it is most useful to test dyes individually.

Only Yellow 5 was tested alone in multiple studies. Three of four studies of hyperactive children indicated an adverse effect on behavior. (Three tests of *non-hyperactive* children did not find significant adverse effects from Yellow 5, though several individuals did react sharply to that dye.) Perhaps the best study, because it used several doses, tested 34 children whose parents thought they were likely or possible reactors to dyes. All 34 were suspected of having ADHD, but only two were diagnosed as such. An additional 20 children were not thought to be hyperactive or have ADHD. Doses of Yellow 5 ranged from 1 mg to 50 mg per day. All six

[53] Lau K, McLean WG, Williams DP, et al. Synergistic interactions between commonly used food additives in a developmental neurotoxicity test. Toxicol Sci. 2006;90:178–87.

dosage levels produced reactions. On the days they consumed the dye, 19 of 23 (83 percent) likely reactors, three of 11 (27 percent) possible reactors, and two of the 20 (10 percent) non-hyperactive children became more irritable, restless, and sleep-disturbed, according to their parents. The researchers stated that the "amplitude and duration of effect increased with increasing dosage levels."[54] Yellow 6 was tested alone in just one small study (with 2 of 13 children reacting).[55]

The absence of tests on most individual dyes should not deter the FDA from revoking the approvals of the dyes, because of several considerations. As a practical matter, multiple high-quality tests of each individual dye on various populations of children (such as children of different ages with and without previously identified behavioral problems) will not be conducted without a requirement by the FDA, and such tests almost certainly would take many years to fund, design, conduct, analyze, and replicate.[56] Meanwhile, children would be suffering harm. Furthermore, with countless combinations of dyes being used in foods (see Appendix 1), it would be impossible to test every combination of dyes. To protect the public's health, the FDA needs to accept the strong evidence that mixtures of dyes, as well as Yellow 5 on its own, affect behavior and initiate proceedings to revoke the approval of all the dyes addressed here. The burden of proof should shift to industry to prove that dyes, individually or in combination with one another, do not affect children's behavior—but responsible companies could voluntarily and immediately switch to safer natural colorings or simply use nutritious ingredients, such as fruit or fruit juice, that the dyes are used to simulate.

IV. Calls for Eliminating the Use of Food Dyes

Based on the results of the two studies it sponsored, as well as the earlier body of research, the FSA has strongly urged companies to eliminate use of the dyes. FSA Chair Dame Deirdre Hutton stated in April 2008:

> It is the Agency's duty to put consumers first. These additives give colour to foods but nothing else. It would therefore be sensible, in the light of the findings of the Southampton Study, to remove them from food and drink products. UK industry has already taken great strides to remove these colours from food; this decision builds on the work already done and will encourage industry to continue down

[54] Rowe KS, Rowe KJ. Synthetic food coloring and behavior: a dose response effect in a double-blind, placebo-controlled, repeated-measures study. J Pediatr. 1994;125:691-8.

[55] Sarantinos J, Rowe KS, Briggs DR. Synthetic food colouring and behavioural change in children with attention deficit disorder: a double-blind, placebo-controlled, repeated measures study. Proceeding of the Nutrition Society of Australia. 1990;15:233.

[56] Not enough is known about dyes and behavior to base decisions on their chemical structures, though some of the dyes have related structures. Yellow 5, the one dye tested on its own in several tests is an azo dye, as are Red 40, Yellow 6, Orange B, and Citrus Red 2. Blue 1, Blue 2, Green 3, and Red 3 are not azo dyes, but they, like most of the azo dyes, are complex, sulfonated (not Red 3 or Citrus Red 2), multi-ringed, organic chemicals. All three dyes used in the British "Southampton" study, but not allowed in the United States, are multi-ringed and sulfonated, and two of the three have the azo structure.

this path.[57]

The FSA also stated: "The FSA is recommending to UK Ministers that industry takes voluntary action to remove these colours by 2009 and is pressing for action at EU level." According to a news account, Dame Hutton added: "If one puts consumers first, then the evidence suggests it would be sensible for these colours to be taken out of the food that children eat, and by definition, out of all foods as you cannot separate the food that adults and children eat."[58]

In May 2008, the European Union's Environment Committee voted to ban artificial colors in foods for babies and small children.[59] That measure also included a warning label on other children's foods: "Azo dyes may provoke allergenic effects and hyperactivity in children." If the European Parliament approves the measure, member governments would have to approve it for the regulatory actions to take effect.

Similarly, in recognition of the risk posed by food dyes, researchers and physicians in the United States now have renewed their call for eliminating dyes from the food supply (see Appendix 3). They note that "the artificial colorings provide no health benefit whatsoever to consumers….On the other hand, the colorings clearly have a significant adverse effect on some children." Therefore, they are urging the FDA "to implement measures that would help protect children from unnecessary harm….[and] to begin proceedings to end the use of food dyes and other unnecessary ingredients that might adversely affect children's behavior."

Those recent calls for action to protect children from food dyes came almost a decade after CSPI's 1999 report and recommendation to the Department of Health and Human Services ("HHS") that it should inform medical professionals and the public that some children are affected by diet and that dietary therapy should be considered as a first course of treatment.[60] CSPI also recommended new research on foods and behavior, more routine testing for behavioral effects of food additives, consideration of a ban on dyes in foods widely consumed by children, and revising HHS's literature and web sites that deny that diet affects behavior.

At the same time, a group of doctors and researchers urged HHS and the FDA to require new, as well as certain existing, food additives to be tested for behavioral effects and to consider

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[57] Food Standards Authority. Board discusses colours advice. April 11, 2008. www.food.gov.uk/news/newsarchive/2008/apr/coloursadvice (accessed April 12, 2008).

[58] Crowley L. Southampton colours should be phased out, says FSA. Food Navigator.com—Europe. April 10, 2008. www.foodnavigator.com/news/printNewsBis.asp?id=84575 (accessed April 10, 2008). Perhaps because of the limited research identifying sodium benzoate as a promoter of behavior problems, the British government's advice focuses on colors. See, for example, www.food.gov.uk/safereating/chemsafe/additivesbranch/colours/hyper/ (accessed April 27, 2008).

[59] Crowley L. MEPs vote for ban on unnecessary colours for kids. Food Navigator.com—Europe. May 7, 2008. www.foodnavigator.com/news/ng.asp?n=85135&c=4ad7aAzQZOnmdHoqSmGJwQ%3D%3D (accessed May 9, 2008).

[60] Letter to Secretary Donna Shalala, sent on Oct. 25, 1999.

banning the use of dyes in foods and other products widely consumed by children.[61]

V. The Food Industry Can Eliminate Food Dyes.

As a result of the 2007 study that it sponsored, the FSA asked food manufacturers to voluntarily stop using the six dyes that were tested. Some of Britain's biggest supermarket chains—Tesco,[62] Sainsbury's,[63] ASDA,[64] Marks & Spencer,[65] and the Co-op[66]—have pledged to drop those colors or all dyes from 99 percent or all of their house-brand products.[67] Some multinational companies sell foods without dyes in the United Kingdom (UK), but with dyes in the United States. For instance:

- Kraft has eliminated artificial colors and flavors from its Lunchables line in Britain,[68] but not in the United States.[69]
- Mars has eliminated some or all of the dyes from its Starburst Chews, Skittles, and M&M'S candies in Britain,[70] but not in the United States.[71]

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[61] Letter to Secretary Donna Shalala, Oct. 25, 1999, signed by Sidney MacDonald Baker, M.D., research director, Children's Development Database; former faculty member, Yale Medical School; former director, Gesell Institute of New Haven; Joseph Bellanti, M.D., professor of pediatrics and microbiology-immunology, Georgetown University Medical Center, Washington, DC; Marvin Boris, M.D. pediatrics, allergy, and immunology, Woodbury, NY; William G. Crook, M.D., director, International Health Foundation, Jackson, TN; Donald R. Davis, Ph.D., Biochemical Institute, University of Texas Austin; Leo Galland, M.D., director, Foundation for Integrated Medicine, New York, NY; William T. Kniker, M.D., clinical professor of pediatrics and internal medicine, University of Texas Health Science Center at San Antonio, TX; Sheldon Margen, M.D., professor emeritus, Public Health Nutrition, University of California, Berkeley; Chairman, editorial board, U.C. Berkeley Wellness Letter; Sidney Walker III, M.D., founder, Behavioral Neurology International, La Jolla, CA. www.cspinet.org/new/adhdletters.html (accessed April 22, 2008).

[62] Tesco. Healthier Food For Kids. https://secure.tesco.com/health/food/healthy_kids/healthier_foods.html (accessed April 30, 2008).

[63] Sainsbury's. Safety & Quality. (May 2007). www.sainsburys.co.uk/food/foodandfeatures/safety_quality/articles/artificial_colours_flavours.htm (accessed April 30, 3008).

[64] ASDA. ASDA gives artificial flavourings and colours the elbow (Dec, 21, 2007). www.asda-press.co.uk/pressrelease/148 (accessed April 30, 2008).

[65] Marks & Spencer. Additives Update (September 2007) www.marksandspencer.com/gp/node/n/63635031/026-3931778-8158034?ie (accessed April 30, 2008).

[66] The Co-operative Food. Responsible Retailing. www.co-operative.coop/food/Responsibleretailing/righttoknow/righttoknowourachievements/ (accessed April 30, 2008).

[67] The proof food additives are as bad as we feared. Daily Mail (Sept. 8, 2007). www.dailymail.co.uk/pages/live/articles/health/womenfamily.html?in_article_id=453431&in_page_id=1799 (accessed March 11, 2008).

[68] Kraft Cuts Dairylea Fat and Salt. BBC News. (Feb. 9, 2007). http://news.bbc.co.uk/1/hi/business/6345205.stm (accessed May 6, 2008).

[69] Oscar Mayer Lunchables. Kraft Foods Inc. 2007. www.kraftfoods.com/kf/Products/ProductInfoSearchResults.htm?CatalogType=1&BrandId=128&SearchText=Oscar%20Mayer%20Lunchables&PageNo=1 (accessed May 5, 2008).

[70] Mars. Statement on Artificial Colours. http://marsconsumercare.co.uk/additives.asp (accessed May 1, 2008).

[71] Mars. Product Nutrition Information. 2007. www.marshealthyliving.com/nutrition_info.jsp?brandId=8# (accessed May 1, 2008)

- Kellogg's cereals, Pop-Tarts and Fruit Winders in the UK do not have dyes,[72] while similar Kellogg products in the United States do have them.[73]
- In the UK, McDonald's vanilla syrup for milk shakes, strawberry syrup for milk shakes, and strawberry sauce for sundaes are colored with caramelized sugar and caramel coloring, beetroot juice concentrate, and actual strawberries, respectively; however in the United States, the same foods are colored with Yellows 5 and 6, Red 40, and Red 40, respectively.[74]
- Coca-Cola's Orange and Lemon Fanta soft drinks contain dyes in the United States, but not in the UK.[75]
- Haribo's Gold-Bears (gummi candies) contain dyes in the United States, but not in the UK.[76]

Finally, it's worth noting that the Whole Foods Markets and Trader Joe's supermarket chains in the United States do not market any foods that contain dyes (or other artificial ingredients).[77,78]

VI. The FDA Has Ample Legal Authority to Ban the Use of Yellow 5 and Other Dyes in Food.

Section 721(b)(4) of the Federal Food, Drug, and Cosmetic Act ("FFDCA"), 21 U.S.C. 379e(b)(4), bars the use of any color additive in food[79] unless the FDA has found that "the data...establish that such use, under the conditions of use specified in the regulations, will be safe." Section 721(b)(5)(C)(i) authorizes the "amendment or repeal" of any food color regulation.[80] Section 201(u) of the FFDCA, 21 U.S.C. 321(u), says that "the term 'safe,' as used in... section 721, has reference to the health of man or animal."

The FDA's regulations say that "safe means that there is *convincing evidence* that establishes with *reasonable certainty* that *no harm* will result from the intended use of the color additive." [emphasis added] 21 C.F.R. 70.3(i).

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[72] Kellogg's. Products. 2008. www.kelloggs.co.uk/products/ (accessed April 30, 2008).
[73] Kellogg's. Products. 2008. www2.kelloggs.com/Product/Product.aspx (accessed April 30, 2008).
[74] McDonald's web sites. www.mcdonalds.com (accessed April 30, 2008).
[75] Coca-Cola web site. www.coca-cola.co.uk/yourhealth/whats_in_our_drinks/; telephone with Coca-Cola Co., Atlanta, GA, May 30, 2008.
[76] Product purchased in London on March 15, 2008, and in the District of Columbia on Feb. 12, 2008.
[77] www.wholefoodsmarket.com/products/ (accessed April 10, 2008).
[78] www.traderjoes.com/labels_and_lists.html (accessed May 10, 2008).
[79] The statute also applies to the safety of color additives in drugs, devices, and cosmetics.
[80] Section 721(d) of the FFDCA permits the manufacturer (or anyone else adversely affected by a proposed repeal or amendment of a color regulation) to ask for a hearing before an Administrative Law Judge ("ALJ") if the FDA proposes to repeal or amend a color regulation. Following the ALJ's decision, the FDA can repeal or amend the regulation. That final order is then subject to review by the federal courts. If the FDA were considering amending a color regulation because of a concern about cancer (which we are not asserting in this petition), then the manufacturer could ask for a review of the evidence by the National Academy of Sciences prior to the ALJ hearing. A legal commentator attributed this complex process "to the foresight and effective lobbying of the cosmetics industry in the 1960s." James T. O'Reilly, *Food and Drug Administration*, 3rd ed. (July 2007) volume 1 at 12-13.

Congress has directed a federal court to sustain the FDA's repeal or amendment of a food color regulation if the FDA's decision is "based upon a fair evaluation of the entire record…." Sections 721(d)(4) and 409(g)(2) of the FFDCA, 21 U.S.C. 379e(d)(4) and 21 U.S.C. 348(g)(2).

A fair evaluation of all the scientific evidence discussed above makes it clear that Yellow 5 and mixtures of various dyes in food are *unsafe* within the meaning of the FFDCA and the FDA's own regulations. Instead of there being "convincing evidence" that the dyes cause "no harm," there is "convincing evidence" that the dyes *do cause* harm to many children.

Moreover, section 721(b)(8) of the FFDCA further provides that in deciding whether to approve a color for all uses the FDA should "take into account…(subject to the paramount criterion of safety)...the availability, if any, of other color additives suitable and safe for one or more of the uses proposed." As discussed above, dyes can easily be replaced by natural food colors or other ingredients.

VII. The FDA Has the Legal Authority to Require, as an Interim Measure, a Warning on Foods Containing Yellow 5 and Other Dyes that these Colorings Can Adversely Affect the Behavior of Some Children.

The FDA's labeling regulations for Yellow 5 and other food dyes merely require that their presence in a food be disclosed on the food's ingredient list.[81] The FDA could amend those regulations to require—as an interim measure before the approvals are revoked—a warning, such as: "WARNING: The artificial colorings in this food cause hyperactivity and behavioral problems in some children." Such a notice should be provided on the principal display panel of products to help ensure that shoppers see it. A warning label is not nearly as protective of the public health as a ban, because (a) it would continue to put the burden on parents to recognize that their child may be sensitive to dyes and then preventing their child from consuming such products and (b) it would be difficult to warn consumers about dyed foods sold at restaurants, cafeterias, and vending machines. Still, a warning notice would impose less of a burden on the food industry than a ban, and some companies would prefer to remove dyes from their products than to put a warning notice on the labels.

Section 721(b)(3) of the FFDCA provides that in order "to assure the safety of the use" of a color additive the FDA "shall...prescribe the conditions under which such additive may be safely employed for such use or uses (including, but not limited to...labeling...for such additive)."[82]

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[81] See, for example, the general ingredient-labeling requirement, Section 403(i)(2) of the FFDCA, 21 U.S.C. 343(i)(2), and the requirement for Yellow 5, 21 C.F.R. 74.705(d).

[82] The FDA relied on this statutory provision when it proposed a regulation requiring that food and cosmetic products containing cochineal extract or carmine declare that fact on their label. 71 Fed. Reg. 4839 (January 30, 2006) at 4845.

Moreover, section 721(b)(6) of the FFDCA goes on to say that "the Secretary shall not list a color additive ... for a proposed use if the data before him show that such proposed use would promote deception of the consumer in violation of this Act or would otherwise result in misbranding ...within the meaning of this Act." Section 201(n) of the FFDCA, 21 USC 321(n), provides, in pertinent part, that "in determining whether the labeling...is misleading there shall be taken into account (among other things) not only representations made or suggested by statement, word, design, device, or any combination thereof, but also the extent to which the labeling...fails to reveal facts material in the light of such representations or material with respect to consequences which may result from the use of the article to which the labeling...relates under the conditions of use prescribed in the labeling...thereof or under such conditions of use as are customary or usual." The omitted fact that dyes cause behavioral problems in some children is certainly a "material" fact for parents of affected children. Therefore, FDA should announce that beginning in 2009 it will consider as misbranded any food containing Yellow 5 or other dyes unless the food's label warns that the food may adversely affect children's behavior.[83]

VIII. Conclusion

For the reasons stated above, the FDA should: (1) ban the use of Yellow 5 and seven other synthetic food dyes and, while revocation proceedings are in progress, require a warning notice on the principal display panels of foods, (2) immediately correct its 1993 advice (updated in 2004) to consumers about research on the risks of food dyes to children with behavioral problems, and (3) add neurotoxicity tests to the standard tests industry is asked to conduct when seeking approval for any new color additives and food additives.[84,85] Eliminating dyes from the food supply should yield a direct health benefit without any health risk, and companies that wish to voluntarily stop using dyes would benefit from the "even playing field" that regulation would provide.

IX. Environmental Impact

The action requested is subject to a categorical exclusion under 21 C.F.R. 25.30 and 25.32 and therefore does not require the preparation of an environmental assessment.

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[83] Misbranded food cannot, of course, be sold in interstate commerce. Section 301(a) of the FFDCA, 21 USC 331(a).

[84] For at least 25 years, behavioral toxicologists have urged the FDA to require neurotoxicity testing of proposed food additives. For example, Bernard Weiss wrote in 1982: "Behavioral toxicity is not yet a component of standard food additive safety testing, but the absence of behavioral criteria from food additive test protocols is beginning to seem a curious anomaly….And the Toxic Substances Control Act of 1976, which mandates premarket toxicity evaluation of all new chemicals introduced into commerce, specifies behavior as one of the criteria of toxicity." (Weiss B. Food additives and environmental chemicals as sources of childhood behavior disorders. J Am Acad Child Psychiatry. 1982;21(2):144-52 at 151.)

[85] See, for example, Environmental Protection Agency. Health Effects Test Guidelines: OPPTS 870.6200 Neurotoxicity Screening Battery. August 1998. www.epa.gov/opptsfrs/publications/OPPTS_Harmonized/870_Health_Effects_Test_Guidelines/Series/870-6200.pdf (accessed May 9, 2008).

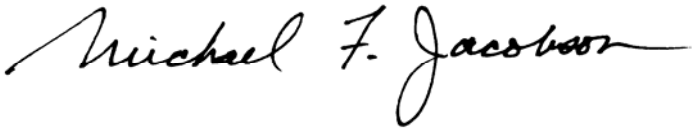
X. Economic Impact

No statement of the economic impact of the requested action is presented because none has been requested by the Commissioner.[86]

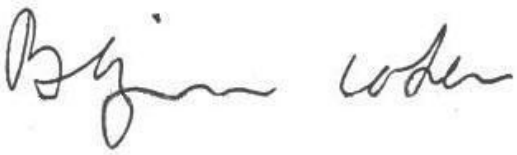
XI. Certification

The undersigned certify that, to the best knowledge and belief of the undersigned, this petition includes all information and views on which the petition relies, and it includes representative data and information known to the petitioner that are unfavorable to the petition.

Respectfully submitted,



Michael F. Jacobson, Ph.D., Executive Director



Benjamin Cohen, Senior Staff Attorney

Stephen Gardner, Director of Litigation

Attachments:
Attachment 1: Diet, ADHD & Behavior – A Quarter-Century Review (updated June 2008)

Appendices:
Appendix 1: Examples of Food Dyes in Processed and Restaurant Foods
Appendix 2: Comment on European Food Safety Authority Review of Dyes and Hyperactivity by Center for Science in the Public Interest
Appendix 3: Letter sent to FDA by physicians and researchers concerned about dyes and children's behavior

[86] 21 C.F.R. 10.30(b).

Appendix 1

Examples of Food Dyes in Processed and Restaurant Foods[87]

Key: B = Blue, R = Red, Y = Yellow, L = Lake[88]

I. PACKAGED FOODS

Chips, Crackers and Dips		
Nabisco	Cheese Nips Four Cheese	Y6, Y5
PepsiCo	Frito-Lay Cheetos Twisted Puffs	Y6
PepsiCo	Frito-Lay Cheetos Flamin' Hot Crunchy	R40L, Y6L, Y6, Y5
PepsiCo	Frito-Lay Doritos Blazin' Buffalo & Ranch	R40L, Y6, Y5, R40, B1, Y5L
PepsiCo	Frito-Lay Doritos Fiery Habanero	Y6L, R40L, Y6, Y5
PepsiCo	Frito-Lay Doritos Cool Ranch	R40, B1, Y5
PepsiCo	Frito-Lay Sun Chips French Onion	R40, B1
PepsiCo	Frito-Lay Sun Chips Harvest Cheddar	Y6, Y5
PepsiCo	Frito-Lay Tostitos Salsa con Queso	Y5, Y6
Sunshine	Cheez-It Crisps Four Cheese	Y6, Y5
Snacks		
ConAgra	Hunt's Snack Pack Pudding Vanilla, ConAgra	Y5, Y6
ConAgra	Hunt's Snack Pack Pudding Butterscotch, ConAgra	Y6, Y5
Dole	Pineapple in Lime Gel, All Natural Fruit	Y5, B1
Dole	Mandarins in Orange Gel	Y6
General Mills	Betty Crocker Fruit by the Foot Fruit Flavored Snacks Berry Tie-Dye	Y5, R40, B1
General Mills	Betty Crocker Fruit by the Foot Fruit Flavored Snacks Strawberry	Y5, R40, B1
General Mills	Betty Crocker Fruit Roll-ups, Crazy Pix, Cool Chix Berry Wave	R40, Y5, Y6, B1, B3
General Mills	Betty Crocker Fruit Roll-ups, Fruit Stackerz Tropical Berry	R40, B1, Y5, Y6
General Mills	Betty Crocker Sour Fruit Gushers Tropical Berry Shock	R40, B1
General Mills	Betty Crocker Scooby-Doo! Fruit Flavored Snacks	R40, Y5, Y6, B1
General Mills	Yoplait Trix Wildberry Blue	B1, R40
General Mills	Yoplait Trix Triple Cherry	R40
General Mills	Yoplait Whips Light & Fluffy	Y5, B1
General Mills	Yoplait Spongebob Squarepants GoGurt Portable Lowfat Yogurt, Strawberry Riptide	R40, B1
Kellogg	Spongebob's Atlantis Squarepants Fruit Flavored Snacks	Y5, R40, B1

[87] Sources of information: CSPI survey of Washington-area grocery stores and chain-restaurant web sites (May 2008).

[88] Lakes are the water insoluble forms of dyes and are used in coated tablets, cake and donut mixes, hard candies, chewing gums, and other products.

Kellogg	Barbie Fruit Flavored Snacks	Y5, R40, B1
Kellogg	Yogos Bits Yogurty Covered Fruit Flavored Bits Strawberry Slam	R40L, R40, Y5L
Kellogg	Yogos Bits Yogurty Covered Fruit Flavored Bits Island Explosion	Y5L, Y6L Y6, B2L, B1L
Kraft	Handi-Snacks Vanilla Pudding	Y5, Y6
Kraft	Kraft Handi-Snacks Sugar-Free Creamy Caramel Pudding	Y6
Kraft	JELL-O Gelatin Dessert, Lemon	Y5, Y6
Kraft	JELL-O Gelatin Dessert, Strawberry	R40,
Kraft	JELL-O Gelatin Dessert, Black Cherry	R40, B1
Kraft	JELL-O Instant Pudding & Pie Filling, Pistachio	Y5, B1, Y6
Kraft	JELL-O Instant Pudding & Pie Filling, Chocolate	R40, Y5, B1
Mott's	Strawberry Flavored Apple Sauce	R40
PepsiCo	Quaker Oatmeal to Go, Raspberry Streusel	R40, Y6
PepsiCo	Quaker Oatmeal to Go, Apples & Cinnamon	Y6
Cereal		
General Mills	Reeses Puffs	R40, Y5, Y6, B1
General Mills	Fruity Cheerios	R40, Y6, B1
General Mills	Lucky Charms	Y5, Y6, B1, R40
General Mills	Trix	R40, Y6, B1
Kellogg	Froot-Loops	R40, B2, Y6, B1
Kellogg	Apple Jacks	Y6, R40, B1
Kellogg	Pops, Chocolate Peanut Butter	R40, Y5, B1
Kraft	Post Fruity Pebbles	R40, Y6, Y5, B1, B2
Kraft	Post Honeycomb	Y5
PepsiCo	Quaker Cap'N Crunch's Crunch Berries	Y5, R40, Y6, B1
PepsiCo	Quaker Oatmeal Squares Crunchy Oatmeal Cereal	Y5, Y6
PepsiCo	Quaker Instant Oatmeal, Dinosaur Eggs	R40L, Y6L, Y5L, B1L
Other Breakfast Foods		
Kellogg	Pop-Tarts one serving of whole grain Strawberry	R40, Y6
Kellogg	Pop-Tarts Frosted Cherry	R40L, R40, Y6, B1
Kellogg	Pop-Tarts Hot Fudge Sundae	Y6L, B2L, R40L, Y5L, Y5, R40, Y6, B1, B2
Kellogg	Eggo Homestyle Waffles	Y5, Y6
Kellogg	Eggo Whole Grain Blueberry Waffles	B2L, R40L
Kellogg	Eggo Blueberry Waffles	B2L, R40L
Kellogg	Eggo Cinnamon Toast Waffles	Y5, Y6
Kellogg	Eggo Lego Homestyle Waffles	Y5, Y6
Kellogg	Eggo Strawberry Waffles	B2L, R40L
Kellogg	Eggo Mini Muffin Tops Blueberry	B2L, R40L
Kellogg	Eggo Cinnamon French Toaster Sticks	Y5, Y6
Meals, Entrees, and Sides		
ConAgra	Kid Cuisine Cheese Blaster Mac & Cheese	Y5, Y6, R40

ConAgra	Kid Cuisine Kung Fu Panda Mac & Cheese	Y5, Y6, R40, Y5, B1
ConAgra	Kid Cuisine Kung Fu Panda Chicken Breast Nuggets	Y5, Y6, R40, Y5, Y6, B1, Y5L
ConAgra	Kid Cuisine Magical Cheese Stuffed Crust Pizza	R40, Y6, B1, B2L, Y5
ConAgra	Kid Cuisine Bug Safari Chicken Breast Nuggets	Y5, Y6, R40, Y5, B1
ConAgra	Kid Cuisine Cheeseburger Builder	R40, Y6, B1, R3
General Mills	Betty Crocker Hamburger Helper Microwave Singles Cheeseburger Macaroni	Y5L, Y6L, Y5, Y6
General Mills	Betty Crocker Cheesy Lasagna with Beef	Y5L, Y6L, Y5, Y6
General Mills	Betty Crocker Beef Taco	Y5L, Y6L, Y6, Y5
General Mills	Betty Crocker Sweet Potato Mashed Potatoes	Y6L, Y5L
General Mills	Betty Crocker Au Gratin 100% Real Potatoes	Y5L, Y6L
General Mills	Betty Crocker Four Cheese Mashed Potatoes	Y5L, Y6L
Kraft	Macaroni & Cheese Three Cheese with Mini-Shell Pasta	Y5, Y6
Kraft	Macaroni & Cheese Thick 'n Creamy	Y5, Y6
Kraft	Spongebob Macaroni And Cheese Dinner	Y5, Y6
Kraft	Scooby Doo Macaroni And Cheese Dinner	Y5, Y6
Kraft	Spiderman Macaroni And Cheese Dinner	Y5, Y6
Kraft	Whole Grain Macaroni And Cheese Dinner	Y5, Y6
Kraft	Pokemon Macaroni And Cheese Dinner	Y5, Y6
Kraft	Shrek Macaroni And Cheese	Y5, Y6
Kraft	Oscar Mayer Lunchables Stackers Ham & Cheddar	Y5
Kraft	Oscar Mayer Lunchables Chicken Dunks	B1
Kraft	Oscar Mayer Lunchables Pizza & Treatza	B1L, Y5L, Y6, Y6L, R40L
Kraft	Oscar Mayer Lunchables Mini Burgers	Y6, Y5, Y5L, R40, R40L
Kraft	Oscar Mayer Lunchables Mini Hot Dogs	Y6, Y5, Y5L, R40, R40L
Kraft	Oscar Mayer Lunchables Mini Tacos	R40L
Kraft	Oscar Mayer Lunchables Pizza Extra Cheesy	R40, Y5, Y6, B1
Kraft	Oscar Mayer Lunchables Pizza Pepperoni Flavored Sausage	R40, Y5, Y6, B1
Kraft	Oscar Mayer Lunchables Cracker Stackers Ham & American	B1
Kraft	Oscar Mayer Lunchables Nachos Cheese Dip & Salsa	B1
Kraft	Oscar Mayer Lunchables Maxed Out Cracker Combo Ham & Cheddar	R40, B1
Kraft	Oscar Mayer Lunchables Maxed Out Ultimate Nachos, Nacho Dip & Salsa	Y5L, Y6L, Y5
Kraft	Oscar Mayer Lunchables Maxed Deep Dish Pizza Pepperoni Flavored Sausage	R40, B1
Nestlé S.A.	Lean Pockets Whole Grain Turkey Broccoli & Cheese	Y5, Y6, Y5L, Y5, Y6, Y6L
Nestlé S.A.	Lean Pockets Turkey Broccoli & Cheese	Y5L, Y5, Y6, Y6L
Nestlé S.A.	Lean Pockets Ham & Cheddar	Y5, Y6
Nestlé S.A.	Hot Pockets Croissant Crust Ham & Cheese	Y6L, Y5L, Y5, Y6
Nestlé S.A.	Hot Pockets Ham & Cheese	Y6L, Y5L, Y5, Y6
Nestlé S.A.	Hot Pockets Croissant Crust Philly Steak & Cheese	Y5L, Y6L

Baked Goods		
Archway	Home Style Cookies, Buttery Vanilla	Y5L
Interstate Bakeries Corporation	Hostess 100 Calorie Packs Golden Cake with Creamy Filling	Y5, R40
Interstate Bakeries Corporation	Hostess Blueberry Streusel Muffins	B2L, R40L
Interstate Bakeries Corporation	Hostess Twinkies	Y5, R40
Interstate Bakeries Corporation	Hostess Orange Cup Cakes	Y5L, Y6L, Y5, R40
Baking Dough and Mixes		
Pinnacle Foods Group Inc.	Duncan Hines Moist Deluxe Butter Recipe Golden Premium Cake Mix	Y5L, R40L
Pinnacle Foods Group Inc.	Duncan Hines Moist Deluxe Strawberry Supreme Premium Cake Mix	R40L, R40, B2
General Mills	Betty Crocker Sunkist Lemon-Poppy Seed Premium Muffin & Quick Bread Mix	Y5, Y6
General Mills	Pillsbury Flaky Cinnamon Twists with Glaze	Y5, R40
General Mills	Pillsbury Reduced Fat Cinnamon Rolls	Y5, R40
General Mills	Pillsbury Crescent Big & Flaky	Y5, R40
Frostings		
General Mills	Betty Crocker Ready To Spread Rainbow Chip Frosting	Y5L, Y6L, R40L, B1L, B2L, Y5, Y6
General Mills	Betty Crocker Frosting Rich And Creamy Cherry	R40, B2
General Mills	Betty Crocker Ready To Serve Creamy Vanilla Frosting	Y5, Y6
General Mills	Betty Crocker Rich And Creamy Coconut Pecan Frosting	Y5, Y6, R40, B1
General Mills	Betty Crocker Ready To Spread Cream Cheese Frosting	Y5, Y6
General Mills	Pillsbury Ready To Serve Vanilla Funfetti Frosting	Y5, R40, Y6, B1
General Mills	Pillsbury Whipped Supreme Strawberry Frosting	R40
Pinnacle Foods Group Inc.	Duncan Hines Whipped Frosting Vanilla	Y5, R40
Pinnacle Foods Group Inc.	Duncan Hines Whipped Frosting Chocolate	R40, Y5, B1
Frozen Desserts		
Nestlé S.A.	Edy's Grand Cherry Chocolate Chip Ice Cream	R40
Nestlé S.A.	Edy's Classic Real Strawberry Ice Cream	B1, R40
Nestlé S.A.	Edy's Grand Neapolitan Ice Cream	R40, B1
Nestlé S.A.	Edy's Loaded Nestle Butterfinger Ice Cream	Y5, R40
Nestlé S.A.	Edy's Dibs Mint Bite Size Ice Cream With Chocolaty Coating	Y5, B1
Nestlé S.A.	Edy's Dibs Strawberry Ice Cream	R40
Mars, Inc.	M&M'S Cookie Ice Cream Sandwich	Y5L, B1L, R40L, Y6L, B2L
Schwan's Bakery, Inc.	Edwards Butterfinger Creme Pie Slices	Y5, R40
Unilever	Popsicle Sugar-Free Life Savers	Y5, Y6, R40, B1
Unilever	Popsicle Ice Pops Dora the Explorer Fruit Flavors Snack-Size	Y5, R40, B1

Unilever	Popsicle Firecracker Pops	R40, B1
Unilever	Popsicle Pops Firecracker Super Heroes	R40, R3, B1, Y5, Y6
Unilever	Popsicle Scribblers Pops	R40, B1, Y5, Y6
Unilever	Popsicle Spongebob Squarepants Pop Ups	R40, Y6
Unilever	Popsicle Variety Mighty Magic Minis	R40, B1, Y5, Y6
Unilever	Popsicle Orange Cherry Grape Pops	Y6, R40, R3, B1
Candies		
Mars, Inc.	M&M'S Milk Chocolate Candies	R40L, Y6, Y5, B2L, R40, B1, B2, Y5L, Y6L
Mars, Inc.	M&M'S Milk Chocolate Peanut Candies	R40L, B2L, B1L, Y6, Y5, R40, B1, B2, Y5L, Y6L
Mars, Inc.	Skittles Original Candy	Y6L, R40L, Y5L, B2L, B1L, Y5, R40, Y6, B1
Mars, Inc.	Skittles Sour Candy	Y6L, R40L, B1L, Y5L, B2L, R40, Y5, Y6, B1
Mars, Inc.	Starburst Original Fruit Chews Candy	R40, Y5, Y6, B1
Nestlé S.A.	Wonka Nerds Grape/Strawberry	B1, B1K, B2, B2L, R40, R40L, Y5, Y5L, Y6, Y6L
Nestlé S.A.	Wonka Sweetarts Candy	B1L, B2L, R40L, Y5L, Y6L
Nestlé S.A.	Nestle's Butterfinger	Y5, R40
The Hershey Company	Hershey's Kissables	R40L, B2L, Y5L, Y6L, B1L
The Hershey Company	Reeses Whipps Light And Fluffy Peanut Butter Bar	Y5L, Y6L, B2L, R40L
The Hershey Company	Hersheys Rainbow Twizzler Twist Candy	R40, B1, Y6, Y5
The Hershey Company	Twizzlers Strawberry Candy	R40
The Hershey Company	Jolly Ranchers Screaming Sours Soft & Chewy Candy	Y5, R40, B1
The Hershey Company	Reeses Pieces	B1L, R40L, Y5L, Y6L
The Jelly Belly Company	Jelly Belly 20 Flavors	R40L, Y5L, Y6L, B1L, B2L, Y5, Y6, R40, B1
Drinks		
Dr. Pepper/Seven-Up Inc.	Canada Dry Caffeine Free Cranberry Ginger Ale	R40, B1
Dr. Pepper/Seven-Up Inc.	Sunkist Orange Soda	Y6, R40
Dr. Pepper/Seven-Up Inc.	Diet Dr. Pepper Cherry Chocolate	R40
Dr. Pepper/Seven-Up Inc.	Hawaiian Punch Fruit Juicy Red	R40, B1
PepsiCo	Propel Invigorating Water, Berry	R40
PepsiCo	Propel Invigorating Water, Citrus	Y6, R40
PepsiCo	Gatorade A.M. Orange-Strawberry Thirst Quencher	R40, Y6, Y5
PepsiCo	Gatorade Lemon-Lime Thirst Quencher	Y5
PepsiCo	Gatorade Orange Thirst Quencher	Y6, R40
The Coca-Cola Company	Minute Maid Lemonade	Y5
The Coca-Cola Company	Fanta Orange	Y6, R40
The Coca-Cola Company	Fanta Grape	R40, B1

II. RESTAURANT FOODS		
McDonald's	Tangy Honey Mustard Sauce	Y5, Y6
	Spicy Buffalo Sauce	R40
	Orange Glaze	R40
	Strawberry Sundae	R40
	McFlurry with M&M'S Candies	Y5, R40, B1L, Y6L, B2L, R40, Y5, Y6
	Strawberry Triple Thick Shake	R40
	Vanilla Triple Thick Shake	Y5, Y6
	Hi-C Orange Lavaburst	Y6, R40
	POWERade Mountain Blast	B1
Burger King	Mott's Strawberry Flavored Applesauce	R40
	Sweet and Sour Dipping Sauce	R40
Wendy's	Cheddar Cheese Sauce	Y5, Y6
	Chili	R40
	Dill Pickles	Y5, B1
	Fat Free French Style Dressing	Y6
	Frosty Shake, Strawberry	R40, B1
	Honey Mustard Dressing	Y5
	Honey Mustard Nugget Sauce	Y5
	Low Fat Honey Mustard Dressing	Y5
	Maraschino Cherries	R40
	Mayonnaise Dressing	Y5, Y6
	M&M'S Candy Crumbles	R40L, B1L, Y6, Y5, R40, B1, B2L, Y6L, Y5L, B2
	Seasoned Tortilla Chips	R40, Y5, B1
	Sweet & Sour Nugget Sauce	R40
KFC	HBBQ Sauce	R40
	Chicken Pot Pie	Y5, R40
	Sweet and Spicy Wings	R40
	Sweet and Spicy Boneless Wings	R40
	Mac and Cheese (*depends upon regional supplier)*	Y5, Y6
	Potato Salad	B1
	Baked! Cheetos	Y6
	Quaker Chewy S'mores Granola Bar	B1
	Apple Pie Mini's	Y5, Y6
	Lil' Bucket Fudge Brownie	R40
	Lil' Bucket Lemon Crème	Y5L
	Lil' Bucket Strawberry Short Cake	R40
	Mountain Dew	Y5

Subway	Banana Peppers	Y5
	Pickles	Y5
	Red Wine Vinaigrette	R40, B1
	Berry Lishus Fruizle Express	R40
	Peach Pizazz Fruizle Express	Y5, B1, Y6, R40
	Pineapple Delight Fruizle Express	Y5, Y6
	Sunrise Energizer	Y5, Y6
	M&M Cookie	R40L, Y5, Y6, B2L, R40, B1L, B1, B2, Y5L, Y6L
Jack in the Box	Blueberry French Toast Sticks	R40, B2, B1, B2L
	Cheddar Cheese Sauce	Y5, Y6
	Egg Nog Syrup	Y5, Y6
	Fanta Orange	Y6, R40
	Fanta Strawberry	R40
	Honey Mustard Dipping Sauce	Y5, Y6
	Maraschino Cherry	R40
	Minute Maid Lemonade	Y5
	Mozzarella Cheese Sticks	Y5, Y6
	Dill Pickle Slices	Y5, B1
	Strawberry Syrup	R40
	Warm Cinnamon Roll	Y5, Y6

Appendix 2

Comment on European Food Safety Authority Review of Dyes and Hyperactivity
by
Center for Science in the Public Interest

The European Food Safety Authority (EFSA) review acknowledges that the Southampton study found "limited evidence that the two different mixtures of synthetic colours and sodium benzoate tested had a small and statistically significant effect on activity and attention in children selected from the general population."[89] However, EFSA took great pains to highlight qualifications, such as (a) whether the effects were clinically significant, (b) that dose-response effects were not tested, (c) that each of the chemicals were not tested alone to ascertain which affected behavior, (d) that there were inconsistencies between the two mixtures, and (e) that a novel metric was used.[90]

EFSA's focus on limitations blinded it from the key result: the Southampton studies found effects of dyes on behavior even though the subjects were children in the general population, not children who had been diagnosed with behavior problems or whose parents thought they were sensitive to dyes and/or other food ingredients. In fact, the studies *excluded* children being treated for ADHD, the children likeliest to be sensitive to dyes, but they *still* found a statistically significant effect of dyes on behavior.

Another factor greatly reduced the chances of finding an effect: the researchers averaged in the results of all the subjects, the vast majority of whom likely were not affected by dyes. Ideally, the study would have presented the results for each individual child (as, for instance, the 1980 Weiss/Williams/Margen study did) to see what percent of the children were affected.

Several other factors reduced the chances of detecting an effect of the dyes on behavior. For instance, though not noted by EFSA, the subjects may have been consuming other food dyes or ingredients that affected behavior, and the subjects may not have adhered as carefully to the diet during the washout periods as they had claimed. In addition, though toxicology studies normally give exaggerated doses of the test chemicals, many children actually consume much more dye than was used in the study.

Still, EFSA is correct in saying that it is impossible to know if all the dyes tested and benzoate affected behavior, because they were not tested individually (or in other combinations). As a practical matter, most of the studies on dyes and behavior used a mixture of dyes, reflecting the real-life situation, not the needs of a regulatory agency. Testing dyes individually would multiply the costs considerably.

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[89] The EFSA Journal. 2008;660:1-54.

[90] The authors of the Southampton study provide a more detailed analysis of EFSA's review in a comment to the FSA. See Annex 3 of FSA's statement on Food Additives and Hyperactivity, April 10, 2008. www.food.gov.uk/multimedia/pdfs/board/fsa080404a.pdf (accessed April 10, 2008).

Appendix 3

Letter sent to FDA by physicians and researchers concerned about dyes and children's behavior

June 3, 2008

Dr. Andrew von Eschenbach, Commissioner
U.S. Food and Drug Administration
5600 Fishers Lane
Rockville, MD 20857

Dear Dr. von Eschenbach:

The undersigned physicians and researchers are concerned about the adverse effects of food ingredients, especially food dyes, on children's behavior, and are troubled by federal inaction on this important issue.

The first hints that food ingredients could impair children's behavior came in the early-1970s, when Kaiser-Permanente allergist Dr. Ben Feingold publicized his clinical findings. His contentions not only generated great public concern, but also spurred scientific research. Many of the studies done over the years, in the United States and abroad, have confirmed that some children are affected by foods or food ingredients, with food dyes being the most frequently identified problem. One of the early studies was actually funded by the U.S. Food and Drug Administration (FDA),[91] and two recent studies were funded by the Food Standards Agency of the British government.[92]

A 2004 meta-analysis of controlled studies concluded that "our results strongly suggest an association between ingestion of [artificial food colorings] and hyperactivity."[93] The researchers stated that "society should engage in a broader discussion about whether the aesthetic and commercial rationale for the use of [artificial food colorings] is justified."

Despite all the evidence from clinical trials, the FDA publishes (jointly with the food industry's International Food Information Council) a pamphlet on "Food Ingredients and Colors" that

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[91] Weiss B, Williams JH, Margen S, et al. Behavioral responses to artificial food colors. Science. 1980;207:1487-8.

[92] McCann D, Barrett A, Cooper A, et al. Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomized, double-blinded, placebo-controlled trial. Lancet. 2007 Nov 3;370:1560-7. Published online Sept. 6, 2007. The same research group published a study of 3-year-olds that also found an effect of a mixture of four dyes and sodium benzoate on hyperactivity. Bateman B, Warner JO, Hutchinson E, et al. The effects of a double blind, placebo controlled, artificial food colourings and benzoate preservative challenge on hyperactivity in a general population sample of preschool children. Arch Dis Child. 2004;89:506-11. The authors stated: "We believe that this suggests that benefit would accrue for all children if artificial food colours and benzoate preservatives were removed from their diet."

[93] Schab DW, Trinh N-H T. Do artificial food colorings promote hyperactivity in children with hyperactive syndromes? A meta-analysis of double-blind placebo-controlled trials. J Dev Behav Pediatr. 2004;25:423-34.

asserts that there is "no evidence" of a link between dyes and hyperactivity.[94] In contrast, the British government is vigorously urging the food industry to stop using the food dyes that were used in the research that it sponsored.[95] In addition, a committee of the European Parliament recently voted to ban dyes from foods consumed by babies and small children and also required a warning notice on foods consumed by older children.[96]

It is important to weigh the risks and benefits of any federal action—or inaction—considering health, economic, and other issues. In the present case, food dyes pose a health risk to many consumers, but no health benefit whatsoever to any consumers. Moreover, the economic benefit to industry appears to be negligible; indeed, some food processors may feel obliged to use dyes only because their competitors use them, but if no one used them, that wouldn't be an issue.

Considering the substantial body of scientific evidence, we urge you to press for measures that would help protect children from unnecessary harm. We suggest the following:

- Begin proceedings to end the use of food dyes that might adversely affect children's behavior.
- Revise or withdraw the FDA's inaccurate brochure "Food Ingredients and Colors."
- Establish testing protocols based on neurobehavioral endpoints for new food additives.[97]

- continued -

[94] www.cfsan.fda.gov/~dms/foodic.html (accessed March 9, 2008). A previous version, "Food Color Facts," is also on FDA's web site.

[95] www.foodstandards.gov.uk/news/newsarchive/2007/sep/additivesboard (accessed March 9, 2008). The British government is focusing on food dyes and the preservative sodium benzoate, which were mixed together in the studies it sponsored.

[96] Crowley L. MEPs vote for ban on unnecessary colours for kids. Food Navigator.com—Europe. May 7, 2008. www.foodnavigator.com/news/ng.asp?n=85135&c=4ad7aAzQZOnmdHoqSmGJwQ%3D%3D (accessed May 9, 2008).

[97] See, for example, Environmental Protection Agency. Health Effects Test Guidelines: OPPTS 870.6200 Neurotoxicity Screening Battery. August 1998. www.epa.gov/opptsfrs/publications/OPPTS_Harmonized/870_Health_Effects_Test_Guidelines/Series/870-6200.pdf (accessed May 9, 2008).

Sincerely,

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