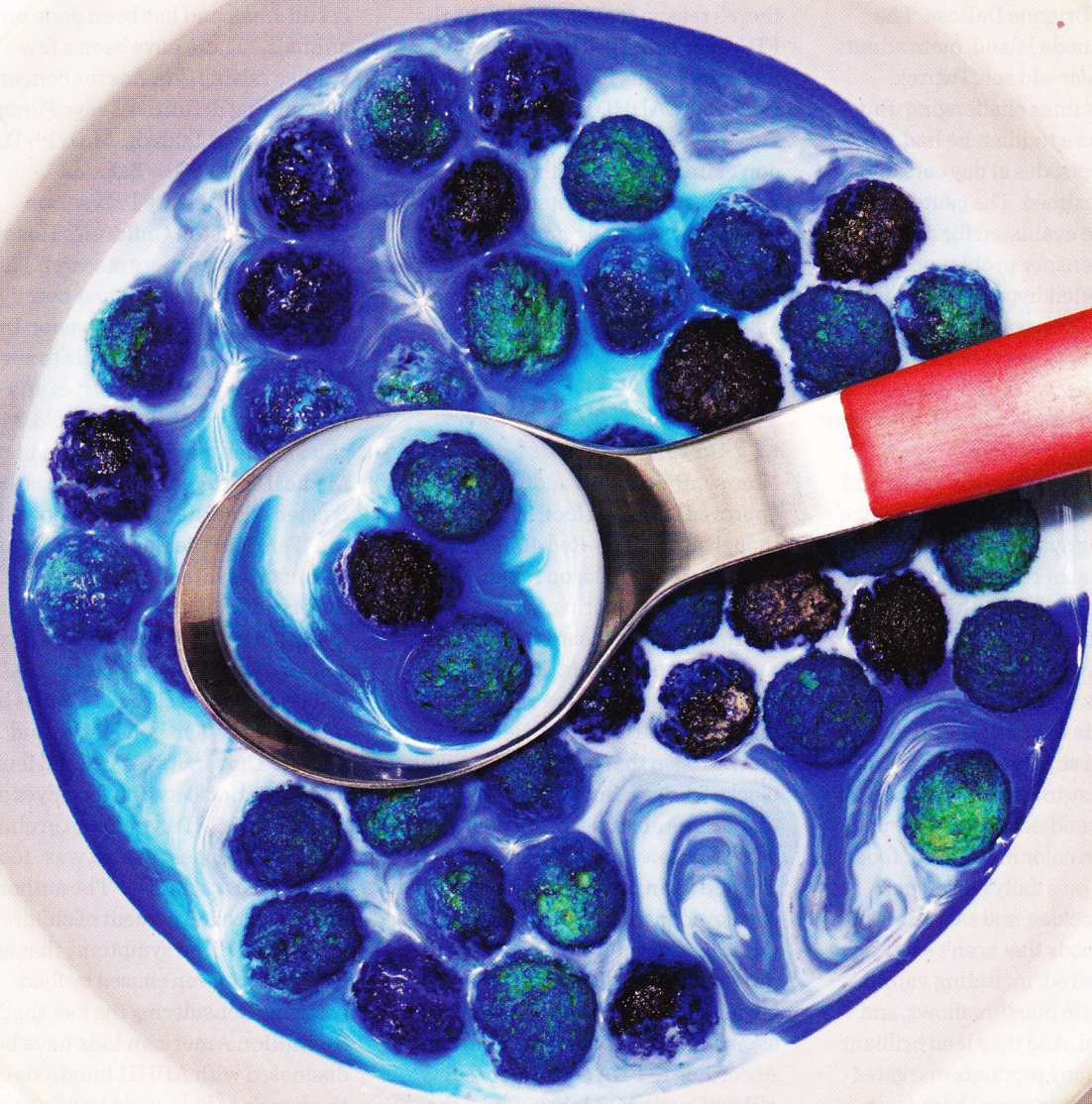




**the
food-dye
blues**



As families are consuming more **artificial colors** than ever, scientists weigh in on whether there's truly cause for concern.

by SALLY KUZEMCHAK, R.D. *photographs by* MARCUS NILSSON

The tantrums were “epic”

remembers Brianne DeRosa. The Cranston, Rhode Island, mom admits that her 5-year-old son, Patrick, is still sometimes challenging. But when he was a toddler, he had rage-filled episodes at day care and couldn't be calmed. The center wanted Patrick to be evaluated for mood disorders, sensory problems, and attention deficit hyperactivity disorder (ADHD). DeRosa wasn't convinced. Since his behavior improved over the weekends, she wondered whether the packaged snacks served at day care could be the culprit.

When she asked for the labels and combed through the ingredients, she kept spotting synthetic food dyes. She asked the teacher to stop giving him the colored snacks, and his tantrums disappeared after a couple of days. “Within a few weeks, it was like nothing was wrong,” says DeRosa.

Man-made food dyes have been in the U.S. food supply for more than 150 years. It's easy to spot them in hot-pink bubble gum and neon-green ice pops. But they also color many other foods families eat on a daily basis, such as waffles, pickles, and salad dressing. They're in foods that aren't even brightly colored, including vanilla frosting, white marshmallows, and brown cereal. And they lend brilliant hues to so many products marketed to kids, including cereal bars, fruit drinks, and pudding cups. Americans now consume more than five times the amount of synthetic food coloring that we did in the 1950s, according to data from the U.S. Food and Drug Administration (FDA).

But food dyes make some parents nervous. In a recent poll of *Parents* readers, 92 percent said they were concerned about food dyes—with nearly 20 percent saying they were very concerned. Although red flags have been raised about food dyes since the 1970s—when researchers began

investigating a potential connection between dyes and hyperactivity—the evidence seems to be building that there's reason for worry. In 2010, the FDA acknowledged that substances in foods, including food coloring, may exacerbate ADHD in some susceptible kids. But the agency insists that they don't affect enough of the population to warrant action and noted that food coloring is safe and tightly regulated. Opponents believe products containing food coloring should carry a warning label—or be banned outright. So is ditching dyes the right thing to do?

what makes a rainbow

Nine synthetic color additives are approved for use in food by the FDA, though just three—Red 40, Yellow 5, and Yellow 6—make up roughly 90 percent of the coloring we eat.

You may have heard that dyes are made from petroleum. It's true that petroleum is the source of molecules made up of carbon, hydrogen, oxygen, and nitrogen that become the building blocks for dyes. But that doesn't mean that drums of crude oil are poured into vats of Yellow 6. Those molecules are isolated from petroleum, purified, and used by food manufacturers in powder, liquid, or crystal form. Consider other products similarly made with building blocks from petroleum: vitamins, aspirin, and even anti-cancer drugs. According to FDA consumer-safety officer Carrie McMahon, Ph.D., the agency puts all color additives through a “rigorous” approval process, requiring manufacturers to submit scientific proof that the coloring is safe. The FDA also checks color additives for contaminants such as lead each time a new batch is made for production.

the attention connection

Worries about food coloring and cancer risk have been around for decades, especially after the FDA stopped allowing the use of Red 2 in

the late 1970s when it was found to be a potential carcinogen. But the body of research on food coloring and cancer is still small and has been done on animals. “There have been a few studies raising grounds for concern but nothing definitive,” says *Parents* advisor David Ludwig, M.D., Ph.D., director of the New Balance Foundation Obesity Prevention Center at Boston Children's Hospital.

There's much more research—and significant findings—about how dyes might affect children's behavior. In the 1970s, one of the first people to suggest a link between color additives and hyperactivity was Ben Feingold, M.D., chief of allergy at Kaiser-Permanente Medical Center in San Francisco. He created what later became known as the “Feingold Diet for ADHD” (which eliminates synthetic dyes, artificial flavors, and some preservatives). In the following decades, research on food coloring and behavior was sparse. Then last year an analysis of 24 studies by researchers at Oregon Health and Science University in Portland found an association between food dyes and increased ADHD symptoms in children that, while modest in size, was “too substantial to dismiss.” The authors estimated that 8 percent of children with ADHD have symptoms that are worsened or even caused by food coloring. Considering the fact that 5.9 million American kids have been diagnosed with ADHD, hundreds of thousands of kids could be affected and helped by avoiding dyes.

When Emily Martin's daughter, Alex, started having attention problems in first grade—falling behind and having trouble focusing and calming down—her teacher suggested removing dyes from her diet. So Martin switched the family to dye-free cereal, juice, and macaroni and cheese, and nixed treats like cherry slushies. “After a month, we saw a big difference,” says the Mount Vernon, Illinois, mom. So did Alex's teacher. Alex was better able to focus in class and wasn't as easily frustrated.



beets

spinach

berries

pure delicious!

Before you reach for food coloring to make frosting for your next homemade treat, try one of these natural tints using fruits or veggies.

Make your favorite white frosting recipe (or find ours at parents.com/frosting), then follow these directions:

green In a blender, combine 3 unpacked cups fresh spinach and ½ cup water until it forms a smooth liquid. Replace the water or milk in your frosting recipe with an equal amount of the spinach mix.

pink Wash, trim, and peel 8 ounces of beets. Cut into small cubes and place them in a saucepan with just enough water to cover, about 1 cup. Cover and simmer until

liquid has reduced to about ¼ cup, roughly an hour. Strain beet juice. Use an equal amount to replace milk or water in your frosting recipe.

purple Puree ½ cup fresh or thawed frozen blackberries in the food processor; press through a strainer set over a bowl. Use 3 tsp. puree for each ¾ cup of frosting; add more if desired.

orange Boil 2 cups of chopped carrots for about 8 minutes; cool puree with ¾ cup water. Use an equal amount in place of the water or milk in your frosting recipe.



carrots

But some doctors aren't sold. There are many parents who don't move forward with medication and therapy for their child with ADHD because they strongly believe that dietary changes alone will help, says Andrea Chronis-Tuscano, Ph.D., associate professor and director of the Maryland ADHD Program at the University of Maryland, in College Park. "Invest your time and energy in approaches that we know work instead of going with something that has shown mixed results," she says. After Jennifer Lynn-Pullman's son, Tyler, was diagnosed with ADHD at age 10, she tried cutting out dyes. But when there wasn't improvement within a few months, the Warrington, Pennsylvania, mom opted for medication. "Tyler's coming home with positive stickers on his papers now," she says.

A possible explanation for the differing results: "There seems to be a wide variation in how children respond to dyes," says Jim Stevenson, Ph.D., professor emeritus of psychology at the University of Southampton, in the United Kingdom. Some kids with ADHD may not respond at all when dyes are removed, some may show improvements from simply reducing the amount of dyes they get, and others may do best having none.

color questions

Kids with existing attention problems may not be the only ones affected by dyes. In a 2010 double-blind, placebo-controlled test, Dr. Stevenson's team gave about 300 children, ages 3 and 8 or 9, drinks that contained dyes, as well as beverages that didn't. Only a few of the kids had an ADHD diagnosis. After they drank the beverages, their behavior was evaluated by teachers, parents, a trained observer, and a computerized test. The result: A significant number of kids in both age groups had higher levels of impulsivity, inattention, and hyperactivity after consuming



dye. "Essentially, the dyed drinks moved some children closer toward ADHD—some only baby steps, some a bigger leap," says Dr. Stevenson. "That means there's a quantifiable risk of attention problems when your child consumes artificial dyes," adds Bernard Weiss, Ph.D., professor emeritus of environmental medicine at the University of Rochester School of Medicine and Dentistry, in New York, who started studying food dyes in the 1970s.

Although nobody knows exactly how food dyes and behavior might be connected, one theory is that in some children the color additives trigger the release of the chemical histamine from cells, and it can act on receptors in the brain. Genetics likely makes some kids more vulnerable to this response. In Dr. Stevenson's research, children who reacted to dyes were more likely to have a specific genetic variation in their histamine system.

That would also explain why some kids don't seem bothered by dyes at all. What isn't known is whether or not all kids would react if the dose were high enough. Another hypothesis is that certain kids have a "leaky gut." So the dyes (which are normally excreted) may instead leak out of the digestive system and be absorbed into the body, explains Laura Stevens, a researcher at Purdue University, in West Lafayette, Indiana, and author of *12 Effective Ways to Help Your ADD/ADHD Child*. There's even a small amount of evidence that yellow dye may cause zinc to be excreted in children with hyperactivity. That's potentially important, since research has found that zinc may play a role in attention.

It's also possible that food dyes themselves aren't the problem. Rather, kids who eat a lot of dyed food may have a diet that's high in processed foods that are less nutritious overall.



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switching to natural colors

In 2010, the European Union began requiring that products containing certain dyes must carry a warning label, stating “[name of dye] may have an adverse effect on activity and attention in children.” But few products in the EU have the label since many manufacturers voluntarily began switching over to naturally derived colors from plants and minerals—such as those from beet juice and paprika—to color the European versions of the foods.

Why doesn't the FDA require warning labels too? A Food Advisory Committee examined the issue in 2011 and noted among its conclusions that there wasn't enough evidence that food dyes cause hyperactivity. In a close vote, the committee deemed warning labels unwarranted. “Some of the data was suggestive of possible effects, but we need more studies,” says committee member Carl Winter, Ph.D., a food toxicologist at University of California Davis. “For me as a scientist, it wasn't a hard decision.” One major criticism of the U.K. study was that the drinks contained a mix of food dyes (some of which aren't used in the U.S.) plus a chemical preservative was added to both groups' drinks, potentially skewing the results.

Others say the FDA dropped the ball. The research has some holes in it, admits Charles Vorhees, Ph.D., professor of pediatrics and child neurology at the University of Cincinnati, who was also on the advisory committee. “But there's enough evidence that something is going on. Why not give people the chance to see the warning label and make up their mind about a product before buying it?” Action is warranted, agrees David Schab, M.D., assistant clinical professor of psychiatry at Columbia University, who testified before the committee. He notes that

all but one member of the committee voted that more research needs to be done on the safety of food dyes. “No one should take the decision not to label as a vote of confidence about dyes,” says Dr. Schab.

If the FDA won't take action, manufacturers should, says Vani Hari, a writer at FoodBabe.com. She began a petition last year asking Kraft to remove food dyes in all of its macaroni and cheese products and replace them with the natural colors the company uses in Europe. “It's an iconic American brand,” says Hari. “If Kraft changed the product, it would send a huge message to other food companies that Americans want this.” Last year, Kraft announced it was phasing out synthetic dyes in some of its products, including character-shaped ones. Its original mac 'n' cheese, however, would remain unchanged. “Making ingredient changes isn't as simple as it would seem,” says Lynne Galia, spokesperson for Kraft Food Group. “All of the ingredients, including colors, work together to deliver the distinctive taste, appearance, and texture people expect and love in this product. Our fans have made it clear they won't settle for anything less.”

Using natural colors is trickier to pull off than using synthetic versions. “The natural colors of beets or mustard seeds have much variation,” says Roger Clemens, Dr.P.H., adjunct professor of pharmacology and pharmaceutical science at the University of Southern California School of Pharmacy, in Los Angeles. The colors are more sensitive to light, heat, and changes in pH levels while synthetic dyes are stable. Naturally derived colors tend to be subtler (even dull) compared with their synthetic counterparts, and that may turn off some consumers. Switching to them could be as much as 10 to 15 times more expensive, notes Margaret Lawson, vice president and chief science officer of

D. D. Williamson, a company that provides natural colors to food and beverage manufacturers worldwide.

But companies seem to be motivated to make the switch when consumers demand it. Yoplait reformulated its popular Go-Gurt yogurt tubes with natural flavors and colors, a change driven by consumer desire, according to a spokesperson for parent company General Mills. Ditto for Chick-fil-A, which announced last year that it would be removing Yellow 5 from its chicken-soup recipe.

what to do now

If you're wondering whether food dyes affect your child, ask her pediatrician for a checklist of ADHD symptoms, make four copies of it, and fill one out. Then remove all foods containing dyes from her diet and complete the checklist every

week for a month, suggests Joel Nigg, Ph.D., professor of psychiatry, pediatrics, and behavioral neuroscience at Oregon Health & Science University in Portland and author of *What Causes ADHD?*

After that, reintroduce the foods you eliminated and see whether your child's symptoms change. Here are a few more steps to take:

● **Check labels.** By law, all synthetic food dyes must be listed by name on the ingredient list (you'll see them as a color plus a number, such as Red 3 or Blue 2). Naturally derived colors, such as beet juice and turmeric, may also be listed. Some natural-foods markets, including Whole Foods and Earth Fare, don't sell products with synthetic dyes.

● **Consider the source.** Synthetic dyes are mostly found in highly processed foods and beverages, and

those should be limited in a healthy diet anyway, notes Kate Geagan, R.D., author of *Go Green, Get Lean*.

● **Focus on foods with a lot of dye.** In the research, children seemed most likely to react negatively to 50mg of dye or more per day. Amounts vary, but according to an analysis of drinks from Purdue University, a glass of pale-pink lemonade may have .2mg while the same amount of dark-red punch could pack 50mg. The more intensely colored a food or drink is, generally the more dye it contains, says Laura Stevens, who conducted the study. In the end, you'll have to figure out how to balance food dyes in your child's diet. Says Geagan: "Even if you prefer zero tolerance or have a no-dye policy at home, you may allow an occasional electric-blue frosted cupcake at a party." ☺

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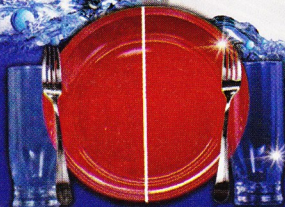
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