

## Hyperactivity and artificial food colours

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Over 30 years ago, it was proposed that much of the hyperactivity involved with learning disabilities could be attributed to artificial food colours (AFCs) as well as certain fruits and vegetables containing salicylates and sugar. Ever since, dozens of scientists have put these theories to the test but the evidence remains controversial.

### What is Attention-Deficit/Hyperactivity Disorder (ADHD)?

ADHD affects one child in each classroom on average - making them impulsive, prone to move about and talk excessively, and unable to maintain attention and organise tasks. Children with ADHD can experience serious difficulties in their academic performance, and one in two carry on with this burden as adults, feeling they can't stick to a job or even keep an appointment.<sup>1</sup>

We don't know the precise cause of ADHD, but there is evidence for a strong genetic influence. Recent research has found differences in the brain activity of ADHD children compared to those of non-ADHD children, particularly in areas that regulate attention, concentration and impulse inhibition.<sup>2</sup>

Psycho-stimulant medication, such as amphetamine and methylphenidate, are widely used to help control the symptoms but they do not cure the disorder. Popularity of these drugs causes increasing concerns over their potential abuse and the lack of data about their long-term effects.

### Is diet involved?

Through the 1970s, scientific papers claimed that 30 to 50 percent of hyperactive children improved when placed on a diet free of substances including AFCs and salicylates (salicylates naturally occur in fruits and vegetables like apples, cherries, grapes, oranges or tomatoes).<sup>3</sup> Others tested this diet and various food additives during the 1970s and 1980s, with variable results - some found a large effect of diet on behaviour and some found little effect.

In 1982, the American National Institute of Health (NIH) concluded that diet restrictions helped a small percentage of children with ADHD.<sup>4</sup> It recommended more research and noted that progress in this area is hindered by our limited understanding of ADHD and a lack of working standard diagnostic procedures. For instance, many children with ADHD also have food allergies. Since food allergies may, by themselves, cause behavioural problems, some children diagnosed with ADHD may not have primary ADHD in the first place.

More recent studies and reviews have however found a substantial dietary effect on ADHD. A 2004 review examined 15 double-blind, cross-over trials using similar AFCs.<sup>5</sup> Under an AFCs-free diet, the average behavioural improvement was between one third and one half the size of that typically seen with medication treatment and occurred in ADHD as well as normal children, which do not support the

hypothesis that “hyperactive” and “normal” children may react differently to these compounds. Another study, in 2004, has confirmed these results in preschool children.<sup>6</sup>

In 2007, a study by researchers at the University of Southampton linked increased levels of hyperactivity in young children consuming mixtures of some artificial food colours and the preservative sodium benzoate.<sup>7</sup>

In 2008, the European Food Safety Authority (EFSA) evaluated the study and concluded that there was limited evidence that the mixtures of additives tested had an effect on the activity and attention of some children.<sup>8</sup> Although the findings from the study could be relevant for specific individuals showing sensitivity to food additives in general or to food colours in particular, it was found not to be possible at present to assess how widespread such sensitivity may be in the general population.

The overall evidence is thus inconclusive and, in the best case, difficult to interpret. Studies have used very different ways of assessing diet effects: some tested full diets and others single ingredients; some added and others removed food ingredients; some tested children who were sensitive to certain foods and others tested children with ‘conduct’ problems or with ADHD, etc.

## Should we be concerned with AFCs?

There is no definitive scientific answer about the role of AFCs in ADHD. Nevertheless, for individuals who want to avoid the consumption of AFCs, their presence is declared on the ingredients list on products. Other dietary factors are thought to play a role in ADHD; deficiencies of the long-chain omega 3 or 6 fatty acids have been noted in some children with ADHD. Many parents and some teachers are convinced that there is a link between diet and ADHD - perhaps, those close to children are able to notice dietary effects that clinicians do not see. Further studies need to be carried out on the potential negative impact of specific dietary components on children's behaviour.

## References

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