

Increasing children's iron intake

I have been concerned about iron intake because of the high incidence of iron deficiency in Aboriginal children in our area. After reading Stanley Zlotkin's article,¹ I thought it might be a good idea to recommend that parents start giving their children Cheerios (General Mills) on a regular basis. According to Table 4 of Zlotkin's article¹ this breakfast cereal has 8.1 mg of iron in a 30-g serving, which is almost 100% of the recommended dietary allowance (RDA) of this mineral (as illustrated in Table 2 of the same article). I then went to my own children's cereal cupboard, where I found a box of Shreddies (Post, division of Kraft Foods); the side panel of the box stated that there was 29% of the RDA of iron in a 30-g serving. These numbers were very encouraging, especially given Zlotkin's strong endorsement of these ready-to-eat cereals.¹

Unfortunately, it all sounded too good to be true. Many of my pediatric patients are already eating Count Chocula (General Mills), which has a stated 45% of the iron RDA per 30-g serving, or similar cereals, yet they are still anemic. A quick check in a standard nutritional text² revealed that the form of iron that is typically added to cereals

is poorly absorbed. Flour and cereals are "fortified" with finely powdered metallic iron, which must be oxidized to ferric (trivalent) iron and then reduced to ferrous (divalent) iron before it can be absorbed in the gastrointestinal tract. The food industry is well aware that this added iron is poorly absorbed.² I would be interested in Zlotkin's comments on the bioavailability of iron in flour and cereals.

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References

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 2. Shils ME, Olson JA, Shike M, Ross AC. *Modern nutrition in health and disease*. 9th ed. Philadelphia: Williams and Wilkins; 1998. p. 212.
- Competing interests:* None declared.

[The author and a colleague respond:]

We thank John O'Brien for his interest in the article on iron deficiency anemia in young people¹ and for his appropriate questions concerning the bioavailability and hence absorption of iron from commercially fortified ce-

reals. This issue has recently been thoroughly reviewed.²

Iron bioavailability depends on the iron compound used, the level of fortification of the food consumed, the iron status of the consumer, and the presence of inhibitors and enhancers of iron absorption in both the cereal and the overall diet. Elemental iron powders have been used for the commercial fortification of cereals for more than 50 years and continue to be the most widely used form of iron for this purpose. The 3 main classes of elemental iron powders are iron reduced by hydrogen or carbon monoxide, electrolytic iron and carbonyl iron. These compounds have the advantage of causing few if any changes in the colour or flavour of prepared cereals. However, the absorption of elemental iron powders is lower than that of other fortifiants such as ferrous sulfate and is often less predictable because of variations in particle size, particle distribution, shape and density. Of the 3 main types of elemental iron powders commercially available, hydrogen-reduced iron is the most commonly used in ready-to-eat breakfast cereals.

A recently completed double-blind randomized trial³ involving 20 non-anemic female volunteers examined absorption of iron from Corn Flakes (Kel-

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1/3 page, 4 clr.

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