First flavors form a lasting impression

Infant feeding experiences help shape flavor preferences later in life

Ever wonder why your child loves to eat macaroni and cheese while her best friend likes nothing better than a steaming bowl of cauliflower curry? The answer may lie in part with what they were fed as young infants. Researchers at the Monell Chemical Senses Center in Philadelphia report that feeding experiences during the first seven months of life may contribute to food likes and dislikes. "This research may help us to understand early factors involved in human food preferences and diet choice, an area with many important health implications. We can explore these early influences systematically by studying infants who are breastfeeding, as well as babies whose parents have decided to formula-feed," explains study lead author Julie Mennella, PhD.

As part of a research program aimed at understanding the underlying basis for individual food differences, the Monell researchers compared flavor preferences of bottle-fed infants raised on two different types of commercially-available infant formula. One was a standard milk-based formula. The second formula is called a protein hydrolysate because the proteins are 'pre-digested' to help babies absorb them more easily. The two formulas are similar nutritionally but differ markedly with regard to flavor: milk-based formulas are described as bland and cereal-like, while hydrolysates taste exceedingly unpleasant to most adults, bitter and sour with a horrible after-taste.

In the study, reported in the April 2004 issue of Pediatrics, 53 babies were fed one of the two infant formulas for seven months. Starting at about two weeks of age, one group was fed only the standard formula while a second group received only the hydrolysate formula. Two additional groups combined three months of hydrolysate feeding, introduced at different times, with four months of standard formula. Because infants accept hydrolysate formulas readily during the first four months of life, all babies were content regardless of the formula they were fed.

At the end of the exposure period, all infants were given the chance to feed both types of formula. The babies' behavior and the amount they fed depended on which formula they had fed during the previous seven months. Seven-month-old babies who had never fed the hydrolysate formula strongly rejected it. In contrast, infants accustomed to the formula appeared relaxed and happy while feeding, and drank more of the hydrolysate formula.

Mennella observes, "It is often difficult for parents to feed these formulas to their babies because they think it tastes bad. These findings reveal if the baby feeds this formula by three months of age, the baby learns to like its taste."

These early influences persist to shape flavor preferences during childhood and perhaps longer. In earlier studies from Mennella's laboratory, 4-to 5-year-old children fed hydrolysates during infancy were more accepting of sour taste and aroma sensory

qualities associated with these formulas than children fed other formulas.

The current findings complement Mennella and co-author Beauchamp's long-term research program on how breastfeeding infants learn about flavors. Because breast milk transmits flavors of mothers' diets to nursing babies, breast-fed babies are exposed to flavor experiences during the nursing period. The Monell researchers suggest that this natural early flavor exposure serves to establish flavors of the mother's diet which will subsequently be fed to the growing child as acceptable and preferred.

Mennella comments on some of the implications, "Because we know that flavor preferences established early in life track into later childhood, eating habits in the growing child may begin to be established long before the introduction of solid food."

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The Monell Chemical Senses Center is a nonprofit basic research institute based in Philadelphia, PA. Scientists at the Monell Center conduct research devoted to understanding the senses of taste, smell, and chemical irritation: how they function and how they affect our lives, from before birth through old age. The Center's approach is multidisciplinary. Scientists from a variety of backgrounds collaborate to address topic areas in sensation and perception, neuroscience and molecular biology, environmental and occupational health, nutrition and appetite, health and well-being, and chemical ecology and communication. For more information about Monell, visit the Center's web site at www.monell.org or email inquiries to media@monell.org.

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