

Maternal & Infant Nutrition Briefs



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A research-based newsletter prepared by the University of California for professionals interested in maternal and infant nutrition



Vegetables and Methemoglobinemia in Infants

Methemoglobinemia is a rare, life-threatening condition, in which the iron attached to hemoglobin exists in the oxidized ferric form and therefore, cannot carry oxygen. Although some cases are hereditary, the condition can also be triggered during diarrhea or through exposure to drugs or oxidizing agents, including nitrites. Nitrates from well-water or food sources can be converted to nitrites in the intestine, are rapidly absorbed, and have previously been linked to methemoglobinemia in infants. Infants less than six months are thought to be more susceptible to methemoglobinemia than older infants, but a recent report from Spain describes seven cases found in infants between seven to eleven months of age. All seven babies were well-nourished and lived in urban areas, where the quality of the water was strictly controlled. In the previous 24 hours, all babies had been fed a homemade purée of mixed vegetables, containing carrots, beets, pumpkin, and/or green beans. Symptoms included cyanosis of the lips (blue lips), vomiting, and irritability. Upon admission to the hospital, one baby had a rapid heart beat, and three had nitrites in their urine, but none had metabolic acidosis. All patients recovered promptly with a treatment of 100% oxygen, and no repeat episodes occurred. The physicians deemed the most probable cause of methemoglobinemia to be nitrates in the homemade baby food. The authors recommend informing parents about the nitrate content of foods in a particular region, but following that recommendation is not so easy. Although nitrate testing of plants is commonly done, not all edible parts are routinely sampled. Moreover, the amount of nitrate in plants can vary from field to field, so there is no reliable way to predict the nitrate content in fresh vegetables from any given store. Generally, leafy vegetables, such as spinach and lettuce, have a higher nitrate content than squash or tomatoes, but amounts in root vegetables (i.e., beets) can be quite variable. If parents prepare homemade vegetable purées, then these foods should be served immediately or kept frozen if not used within 12 hours. Nitrate content increases in puréed greens that are prepared in advance and stored in the refrigerator. Parents who are very concerned about nitrates may want to use commercially prepared baby foods, because the food companies are able to monitor nitrate levels closely and can work with their growers

to keep nitrate content at lower levels.

Source: Sanchez-Echaniz J, Benito-Fernandez J, Mintegui-Raso S. Methemoglobinemia and consumption of vegetables in infants. *Pediatrics* 2001; 107: 1024-1028.

Should Nursing Mothers Avoid Peanuts?

An allergy to peanuts starts early in life and can provoke a severe, life-threatening reaction. Most people who react to peanuts appear to do so upon first exposure. However, since prior sensitization to the allergen is generally needed, previous exposure prenatally or through breast milk may be involved. Other studies have shown that women who eat peanuts more than once a week are more likely to deliver a child with peanut allergies than mothers eating peanuts less often. Recently, a brief report in the *Journal of the American Medical Association* provided evidence that mothers can pass peanut protein into their breast milk. Twenty-three healthy, nursing mothers, with no known allergies to peanuts, consumed 50 grams of peanuts (about ½ cup) and collected samples of their breast milk before and at 1, 2, 3, 4, 6, 8, and 12 hours afterwards. The samples were analyzed for the presence of total peanut protein. Peanut protein was found in breast milk from about half of the mothers (11 of 23). For most women, the protein appeared in the milk about 1-2 hours afterwards, but in one case, the protein was not detected until 6 hours later. Both of the major peanut allergens were also found in breast milk. The sample size was too small to determine which factors may have influenced whether or not peanut protein appears in breast milk. This small study captured the attention of the popular press, probably because it provides some of the first evidence the early exposure to peanut protein may occur during breastfeeding. Thus, some advisory to parents with a family history of peanut allergy may be warranted.

Source: Vadas P, Wai Y, Burks W, Perelman B. Detection of peanut allergens in breast milk of lactating women. *JAMA* 2001; 285 (13): 1746-1748.

Exercise around the Time of Conception-Is it Safe?

About 50-80% of early miscarriages are related to chromosomal abnormalities, but what explains the other 20-50%? Physical strain may be a factor, but previous studies have not explored its role adequately. The purpose of this study was to determine whether daily measures of physical strain are associated with an increased risk of early pregnancy loss. The study was carried out in Denmark in a nation-wide sample of 430 couples, who were planning their first pregnancies. After discontinuing birth control, the subjects provided data for six months or until a pregnancy was confirmed. The couples completed a battery of questions, yielding detailed data on occupational exposure, lifestyle, and personal and medical history. In addition, the women kept daily records on physical strain, sexual intercourse, and vaginal bleeding. They also collected urine samples for the first 10 days of each menstrual cycle, so that the researchers were able to document subclinical pregnancy loss, as well as other pregnancy outcomes. Spontaneous abortion was defined as pregnancy loss occurring within the first 28 weeks of pregnancy. The women ranked their level of physical strain from none to very high, with examples of the latter including an exhausting tennis match, frequent lifting of heavy loads, or long-distance running. After controlling for other factors such as mother's age, tobacco use, and caffeine intake, the authors found any degree of physical strain occurring between 4 to 10 days after ovulation increased the risk of early pregnancy loss by 2 to 2.5 times. The timing of the loss was much more likely to occur after 5 weeks of gestation than before that point. A puzzling, unanswered question is why physical strain around the time of implantation does not increase the risk of loss until after 5 weeks gestation. Given the study design, physical strain occurring later on could also be involved. Another issue not

considered is how the mother's level of conditioning might influence the degree of physical strain she experiences. Based on these and other concerns, one reviewer concluded that, "Until all of this is resolved, if I were a woman wanting to get pregnant, I would not forego my favorite exercise or shun the physical demands of work."

Source: Hjollund NJI, Jensen TK, Bonde PE, Henriksen TB, Andersson AM, Kolstad HA, Ernst E, Giwercman A, Skakkebaek NE, Olsen J. Spontaneous abortion and physical strain around implantation: a follow-up study of first-pregnancy planners. *Epidemiology* 2000; 11:18-23

Long-term Effects of Soy Formula during Infancy

Infants who consume soy-based formula are exposed to relatively high doses of isoflavones, which occur naturally in soy. Isoflavones are compounds that act like estrogens or anti-estrogens. Animals given feed containing isoflavones may have various reproductive problems, particularly related to lower conception rates and decreased fertility. Although 18% of all infants in the U.S. are fed soy-based formula sometime during the first year of life, little is known about the long-term effects of soy on developmental and reproductive outcomes in humans. A recent study published in the *Journal of the American Medical Association* reports data from one of the largest controlled studies to examine long-term effects of soy formula during infancy. This retrospective study relied on a group of adults, ages 20-34 years, who participated as infants in randomized feeding trials conducted by the University of Iowa. All individuals in the study had been exclusively formula-fed, with either a cow-based or soy-based formula for the first 4 months of life. Of the original 952 in the infant studies, the researchers were able to locate and interview 811 (396 females, 415 males). The researchers used a detailed phone interview to collect data on height, usual weight, pubertal development (eg. age at menarche or first ejaculation, etc.), and for women, variables related to menstruation and reproductive outcomes (eg. number of pregnancies, miscarriages, stillbirths etc.). Usual intake of soy products, vegetarian diets, and other current lifestyle variables were considered in the analysis. With a subsample of 81 subjects, the researchers were able to determine that self-reported outcomes matched with actual medical records at least 70% of the time. For most of the 30 outcomes examined, no statistically significant differences were found. Women who had been fed soy-based formula had slightly longer periods (mean difference 0.37 days) and more menstrual discomfort than women fed cow's milk formula during infancy. The authors calculated that the sample size should be large enough to test for the primary outcomes-i.e., effects of soy during infancy on variables related to body size, pubertal development, and menstruation. Other possible outcomes, such as homosexual orientation, testicular cancer, and hormone disorders, were also examined, and no effects were found. However, the sample size was not expected to be large enough to get reliable results for these secondary outcomes. The authors did not specifically say whether the sample size was large enough to examine reproductive outcomes, given that more than half of the women had never been married or pregnant. Moreover, there were significant differences in the age distribution of the subjects that may have influenced results: 48% of the women fed soy were between 20-24 years of age vs. only 24% of the women fed cow's milk. To their merit, the researchers did not have to rely on recall to identify exposure to soy-based formula during infancy and calculated the validity of using self-reported variables. However, to determine if past exposure to soy-based formula affects reproductive outcomes, a more rigorous design among couples planning a pregnancy is probably needed.

Source: Strom BL, Schinnar R, Ziegler EE, Barnhart KT, Sammel MD, Macones GA, Stallings VA, Drulis JM, Nelson SE, Hanson SA. Exposure to soy-based formula in infancy and endocrinological and reproductive outcomes in young adulthood. *JAMA* 286(7): 807-814.

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