

## Bottle + breast = risky combination?

As a rule, pediatricians recommend that even some breast-feeding of an infant is better than none. They point out that it encourages greater mother-infant bonding than does bottle feeding, while imparting some natural immunity to disease. As a result, millions of mothers who work outside the home have been persuaded to continue breast-feeding their infants long after the maternity leave is over. However, because these women are no longer around for the frequent daytime feedings their babies require, most supplement their nursing with standard infant formula.

Now, research in animals suggests that for relatively few babies, "supplementing breast milk with infant formula may prove much worse for the infant than feeding it artificial formulas alone," according to W. Allan Walker, chief of the Combined Program in Pediatric Gastroenterology and Nutrition at Harvard Medical School. The findings by Walker and his co-workers at Harvard and Children's Hospital in Boston suggest that feeding both breast milk and formula may increase an infant's risk of developing food allergies and serious inflammatory intestinal disease. Walker described his data last week in Washington, D.C., at a Bristol-Myers Co. research briefing.

Beyond its nutritional value, breast milk provides the infant with benefits that can't be received through other dietary supplements, says Walker, an immunologist. He and his colleagues have shown in animal studies and organ culture research that various factors available only in breast milk appear to stimulate the maturation of the infant's intestinal surface. And over the past several years, Walker and others have shown that an infant's resistance to disease can be profoundly affected by how "mature" its intestinal surface is. (Full maturation of the gut surface can take six months to a year.)

Walker and his co-workers have shown, for example, that the immaturity of cells in the infant's intestinal surface appears to account for the enhanced binding to the young intestine of potentially dangerous bacterial products, such as cholera toxin. They have also shown that foreign proteins — such as those introduced by infant formulas — are more likely to bind to the intestinal surface if its cells are immature. And their animal research suggests that the intestinal surface matures less rapidly in formula-supplemented infants than in those receiving breast milk only.

Finally, their studies suggest that something in breast milk seems to "modulate" or exaggerate the immune response of an infant's intestinal tissue to foreign proteins. "We're convinced that it has to be the 'growth factors' in the breast

milk that stimulate this immunological response," he told SCIENCE NEWS.

In breast-fed infants these growth factors are generally considered a benefit, he says, because they help mature the intestinal surface, protecting it from infection and increasing its ability to absorb nutrients. However, Walker's studies indicate that this immune stimulation can also cause an exaggerated reaction in the gut to the foreign dietary proteins — such as the soy protein in soybean-derived infant formulas or the casein in those derived from cow's milk. If the immune response causes a "sensitization" to these proteins, further exposure to them — in formula or other foods — might elicit an allergic response. If the source of the foreign protein was a bacterium or its toxin, a major inflammatory disease could result.

Walker cautions that although these findings in animals and cultured human fetal-intestinal tissue have not yet been proven in humans, "we are seeing an increasing number of infants referred to our hospitals with similar, immunologically related diseases — like colitis or inflammatory diseases of the small intestine. And [the affected infants'] mothers are partially breast feeding and formula feeding." Infants at risk appear to be those with a strong family history of milk allergies. To study the apparent association more rigorously, Walker is setting up a controlled clinical study of nursing infants in the Boston area.

"Whether the combination of breast and formula feeding is worse than formula feeding alone is indeed worth looking at," says Pearay Ogra, chief of infectious diseases at Children's Hospital of Buffalo, N.Y. His own work has shown that children fed both breast milk and formula develop more complex microflora in the gut than breast-fed-only infants, and that these dual-fed infants tend to develop more disease.

William Heird, at Columbia University in New York City, also believes "[Walker's] theoretical data are sufficiently convincing to justify their testing in a more clinically relevant model." Heird's own animal research indicates that the responsiveness of the immature gut to the stimulating growth factors that Walker mentioned lasts only for a finite time. How long this lasts in humans — whether days, weeks or months — has not been determined, he adds.

In the meantime, Walker says, nursing women can avoid the potential antigenic proteins in standard infant formulas by feeding their infants only "hydrolysate" formulas. Though more expensive, their foreign protein has been "partially digested," Walker explains, and therefore poses little risk of provoking an allergic-type reaction. Alternatively, a woman

could go "cold turkey" — switch from breast-feeding only to bottle-feeding only.

What he emphasizes is that his preliminary findings should not be read as a discouragement of breast-feeding. "It's still the best food a baby can get," he says.

—J. Raloff

### Crash halts burn attempt

Since Sept. 15, scientific investigators scheduled to participate in the largest fire experiment in history — a massively instrumented study of the environmental effects of a 2,000-acre chaparral forest fire (SN: 10/4/86, p.213) — have been on 24-hour call. Three times it looked as though they were within a day or two of carrying it off. But each time, weather conditions — clouds that would obscure remote-sensing data, rain that would slow the burn or high winds that would make containing the fire difficult — necessitated a last-minute postponement. Then, on Dec. 3, a picture-perfect day, the go-ahead was given.

The pilot of a Los Angeles County Fire Department helicopter flew along the perimeter of a test area, pumping out a thin stream of burning gasoline from a torch suspended from a cable about 30 feet below the copter. But as the pilot was maneuvering a turn, the torch hooked a telephone line. Just five minutes into the project, the copter crashed.

"Thank God nobody was injured," says Philip J. Riggan, a U.S. Forest Service ecologist in Riverside, Calif., and coordinator of the burn experiment. "If the helicopter had come down 20 feet either way of where it did, there is a good chance it would have rolled 1,000 feet down the hillside." As it was, after tumbling about 100 feet, the vehicle was snagged by a small oak. The pilot emerged with a few bumps and scratches. The helicopter, however, was totaled and the project halted.

But not before Wesley R. Cofer, an atmospheric chemist from NASA Langley Research Center in Langley, Va., was able to sample combustion gases generated by the five or six acres that had been ignited. "Ours is probably the only experiment that obtained measurements," says his colleague, Joel Levine. "And they show our equipment works perfectly." Weather permitting, they'll get to try them again on Dec. 11 or 12.

This may be the last chance this season, however. Robert Swinford, the project spokesman, told SCIENCE NEWS on Monday that, owing to other commitments by some of the plane crews and investigators, "if we can't schedule the burn in the next 10 days, we'll probably have to hold off until next May."

—J. Raloff