Monkeying with mother-infant bonds

More and more children these days are spending time in day-care centers or in the alternating custody of their divorced parents. And both of these social trends have raised concerns about the consequences of repeated maternal deprivation on children's mental health. Scientists studying rhesus monkeys now report evidence that weekly mother-infant separations (analagons to alternating custody) may have lasting, and surprising, long-term effects. Infants who are repeatedly removed from their mothers appear as time goes by to function normally in all social relationships except one: Once on their own they actively avoid their mothers, choosing other adults or even solitude over reunion.

Psychologist Stephen J. Suomi and coworkers at the University of Wisconsin in Madison studied infant rhesus monkeys that were separated from their mothers four days each week for 16 weeks; at the start the monkeys were three months old, the equivalent of a one-year-old human baby. As they report in the September DEVELOPMENTAL PSYCHOLOGY, the infants responded to separation with protest, but this response diminished with repeated separations. The separated infants showed few signs of real despair while away from their mothers, and seemed in general to adapt well to their forced independence.

At the same time, the researchers report, the separations appeared to retard normal development of the mother-infant relationship itself. While infant monkeys normally become increasingly independent from their mothers during the first nine months of life, the experimental monkeys spent most of their time during reunions clinging to the mother's stomach —a typical infantile behavior.

The most surprising results came later. At one year, all of the monkeys (including controls) were permanently removed from their mothers and housed with peer groups. During 30 weeks in this situation, the experimental monkeys showed no significant differences in social development —suggesting that their early experiences had no general lasting effect on behavior. However, when given the opportunity to reunite with their mothers at 18 months of age (the equivalent of 6 years for a human child), the subjects appeared to actively avoid their mothers; while control monkeys clearly preferred their natural mothers to other adults, the experimental monkeys consistently chose other adult females, peers or even isolation over reunion with their mothers.

Suomi (who recently joined the National Institute of Child Health and Human Development in Bethesda, Md.) cautions against generalizing too freely from animal studies to human conditions. The weekly separations simulate what often occurs in a joint custody arrangement, but the consequences of separation, he says, would certainly depend on the timing of the separations and the richness of the infant's environment while separated; his monkeys, he notes, were kept in relatively barren cages.

In another experiment, Suomi told SCIENCE NEWS, infants separated and reunited daily (as in day-care) showed only very mild and transient effects.

— W. Herbert

NIH is sued over gene-altering issue

Release of genetically engineered material into the environment is now being opposed in federal court. Representatives of four citizen groups have filed suit against the National Institutes of Health and its parent agency, the Department of Health and Human Services, for giving approval to three teams of scientists to conduct field experiments involving bacteria and plants altered by recombinant-DNA techniques (SN: 8/27/83, p. 132).

The plaintiffs are Jeremy Rifkin and his Foundation on Economic Trends, Environmental Action, the Environmental Task Force, and Michael W. Fox of the Humane Society of the United States. Their suit charges that release of genetically engineered life forms poses a potential danger to plant, animal and human health; that NIH has failed to prepare an environmental-impact statement; and that NIH's Recombinant DNA Advisory Committee lacks the expertise to evaluate risk to plant and animal health. It also states that NIH has failed to establish adequate protocols for evaluating environmental risks. The Foundation on Economic Trends says that it will take years to develop many of the appropriate testing procedures.

Two types of risk are mentioned in the lawsuit. One pertains to the most imminent experiment, a trial release of genetically engineered bacteria in the field to replace natural ice-triggering bacteria. The suit contends that if bacteria modified so that they lack the ability to induce ice formation were to enter the upper atmosphere and replace their normal counterparts there, deleterious climatic effects might result. A more general risk involves introducing "exotic" organisms into new environments.

The suit does not address the many similar experiments — already completed — which used life forms altered by conventional genetic methods rather than by recombinant-DNA techniques.

Commenting Tuesday, NIH's Bernard Talbot told SCIENCE NEWS: "We have not officially replied to the lawsuit, but as far as NIH is concerned, as of today [the initial three field trials] have NIH approval to proceed." *—J. A. Miller*

Fetal vaccination found possible

After years of basic research, University of Pittsburgh scientists have found that human fetuses can be immunized via maternal vaccination during pregnancy. The finding, by Thomas J. Gill III and team, is reported in the September JOURNAL OF CLINICAL INVESTIGATION.

Eighteen years ago Gill and his coworkers started exploring genetic control of the body's immune response. This basic research led serendipitously to the finding that it was possible to immunize fetal rats by vaccinating their mothers during pregnancy — something which hadn't been known before. Recently, Gill and his colleagues undertook a trial to see whether they could achieve the same thing in humans —something which no one had ever explored. They decided to test the tetanus vaccine because of its extraordinary safety record among people.

Forty-two pregnant women received a tetanus vaccine by under-the-skin injection, in hopes that the vaccine would cross through their placentas and immunize their fetuses. Twenty-five pregnant women did not get the vaccine and served as controls. The offspring of both groups were compared after birth and up to a year or so later to see whether they differed in their immune responses to tetanus. They did, the scientists found. At birth only children born to vaccinated women had antibodies against tetanus. During the first year of life children born to vaccinated mothers had a more rapid and stronger immune reaction to direct tetanus vaccination than did children born to controls. And at 13 months of age children born to vaccinated mothers had more immune protection against tetanus than did children born to controls.

In an interview, Gill said that their discovery could benefit children in developing countries and certain areas of the United States who are not likely to get a tetanus vaccine during the first year of life, when it is ordinarily given. The reason, he explained, is that while mothers of such children are not likely to bring them to health care facilities for shots during the first year of life, they are still probably going to seek medical care during pregnancy. Thus the children could be vaccinated against tetanus at that time.

Gill likewise foresees a vaccine against diphtheria, and possibly also vaccines against scarlet fever and meningitis, being given to human fetuses. These vaccines are made of non-genetic material taken from live or killed microbes, just as the tetanus vaccine is. This way they can provoke an immunological reaction, yet have no opportunity of causing disease, which vaccines made from live or supposedly killed microbes (containing genetic material) might. *—J.A. Treichel*