Behavior

Drugging the baby too

The administration of pain-relieving drugs to women during labor and delivery has sparked controversy in recent years. The present trend toward natural childbirth reflects, in part, fear of possible harmful effects of drugs on newborns. Now there appears evidence that seems to substantiate this fear. Researchers at the National Institute of Child Health and Human Development in Bethesda, Md., studied the effects of local-regional anesthesia and analgesia given during childbirth on 60 three-day-old babies. They found that infants whose mothers received anesthesia and/or analgesia were more irritable and exhibited less motor maturity than those whose mothers were not medicated. In addition, they found that the use of anesthesia appears to have a greater influence on infants' behavior than does analgesia. They report their findings in the Nov. 15 SCIENCE.

All babies involved in the study were children of white middle-class women who had received routine antenatal care and had medically uneventful pregnancies and deliveries. Eight women received no anesthesia and of the 52 who received anesthesia, 42 were given spinal anesthesia. The researchers evaluated alertness, irritability and motor maturity by the Brazelton neonatal assessment scale.

Though it is known that anesthesic drugs cross the placenta and enter fetal circulation, Kay Standley, A. Bradley Soule III, Stuart A. Copans and Michael S. Duchowny could find no evidence of these drugs in the infants later than one day after birth. They propose several explanations for this phenomenon: Though medication may no longer be detectable in the circulation, it could be bound at sites on the central nervous system; or the use of anesthesia could reflect aspects of the mother's personality having to do with the need for medication that are transmitted genetically or in utero to the fetus and manifested in the baby's temperment.

"Whatever the interpretation," the researchers comment in SCIENCE, "it appears that anesthesia administration during childbirth is significantly related to the functioning of the newborn child. Local-regional anesthetics, although known to produce physiologic reactions in high doses, continue to be considered a safe choice in standard obstetric procedures. Our data raise questions about the assumption that routine usage of these anesthetic agents is inconsequential, even for the normal, healthy infant."

What's up, doc?

Why do people become vegetarians? A study by nutritionists at the Harvard School of Public Health on 100 American adults who became vegetarians after reaching maturity sheds light on this puzzling phenomenon. In the November JOURNAL OF THE AMERICAN DIETETIC ASSOCIATION, they report that the most frequently cited reasons are: Forgoing meat leads to improvements in outlook and intellectual function, such as less grogginess and fresher approaches to mental tasks; meat is hazardous to health because of "hormones," "chemicals," saturated fats, etc. and that the philosophy of nonviolence can be expressed through this eating habit. Those that belong to vegetarian organizations were more likely than "loners" to base their diets on metaphysical reasons that center around the belief that nonmeat diets are a means of achieving spiritual or interior balance. Another prelavant belief is that eating meat is unnecessary and wasteful in view of the ecological, environmental and population problems of the world.

Chemistry

Man-made membrane, almost alive

Chemists at Case Western Reserve and Carnegie-Mellon Universities have developed the first functioning chemical analog of the living membrane. It will selectively move sodium and other ions against their concentration gradients—that is, from areas of lower to areas of higher concentration. Diffusion in the nonliving world is passive; ions move from higher concentrations to lower until equilibrium is reached. But, as in living membranes, the artificial system relies upon carrier molecules to combine with the ions and transport them across gradients.

Carnegie chemists D. Fennell Evans and Edward L. Cussler and Edmund M. Choy of Case Western Reserve report the development in the Oct. 30 JOURNAL OF THE AMERICAN CHEMICAL SOCIETY. The sodium system includes a trilayered membrane (the inside layer of which is soaked in a solution of octanol), the antibiotic monensin as the carrier molecule, an acid solution on one side of the membrane and a basic solution on the other side. Monensin is less soluble in acid and base than in octanol, so it remains within the membrane. It picks sodium ions from the basic solution, carries them across the membrane and releases them into the acid solution.

Once the simple system was worked out, the team tested solutions containing ions of zinc, lead, mercury and copper, among others. They found that the principles are widely applicable, but that the pH and appropriate carrier molecules differ and must be adjusted for each type of ion.

The team also tried a variation on the stationary membrane concept, by making tiny droplets of basic solution surrounded by a membrane of oil containing a carrier. When the droplets were suspended in an acidic solution containing chromium, the droplets concentrated the metal.

The active membranes may have industrial potential. Waste treatment plants might remove more heavy metal pollution this way.

Vitamin D, diabetes and bone disease

Vitamin D, also called calciferol, is needed by the body to promote the proper utilization of calcium and phosphorous. Lack of it can lead to rickets and other bone diseases. It has been noted that some diabetics who don't respond to insulin treatment also suffer from bone degeneration. Missing—until now—was evidence linking diabetes with the body's normal use of vitamin D. Three biochemists presented that evidence at the November American Chemical Society meeting in Iowa City.

Louis Schneider and Harold P. Schedl from the University of Iowa College of Medicine and Jack L. Omdahl of the University of New Mexico College of Medicine reported experiments with diabetic rats. The rats were able to absorb vitamin D from their food, but unable, apparently, to break it down into the normal metabolites. The metabolites are essential for the body's production of a protein, which can bind calcium and make it available for proper bone growth and repair. The team found that injections of a vitamin D metabolite increased calcium absorption by the diabetic rats, thus confirming the hypothesis.

Although the effects were seen and tested only in rats, Schneider things it likely that they also occur in humans, considering the observations of bone degeneration. The implication of their finding, he says, is that "the effects of diabetes on normal body functions are more far-reaching than we hitherto expected."