Crib death: A genetic factor?

Despite the scores of theories advanced about the cause and nature of Sudden Infant Death Syndrome, SIDS continues to claim up to 10,000 infant lives each year and remains a medical enigma. But there are signs that the disorder may be growing somewhat less mysterious.

It is widely accepted by most medical researchers, for instance, that the syndrome involves some abnormal response to a temporary breathing blockage — a normal baby overcomes a blockage during sleep by momentarily choking or gasping for air, but the SIDS victim apparently is unable to compensate and dies during sleep. Results of one major research project indicate that this abnormal response may result from an inborn "learning disability" programed into a youngster's nervous sytem (SN: 4/15/78, p. 234).

Now, a report in the Feb. 28 NEW ENGLAND JOURNAL OF MEDICINE suggests that this type of SIDS response may not only be inborn but inherited. Researchers from Rutgers University Medical School in Piscataway, N.J., report that parents of SIDS victims respond significantly more poorly than do a matched group of control parents of normal children to two tests: breathing response to a high carbon dioxide mixture and an unconscious, compensatory response to a split-second blockage during inhalation.

While the results, obtained from 12 sets of SIDS parents and 12 sets of non-SIDS parents, "could not be expected to identify unequivocally the cause of SIDS," they do indicate that such deficient responses by the adults "may increase a potential parent's risk of having a child susceptible to SIDS," report Philip L. Schiffman, Robert E. Westlake, Teodoro V. Santiago and Norman H. Edelman.

The scientists note that apnea (momentary loss of breath) and other breathing problems tend to "cluster" in families. One interpretation of the study suggests that "the chances of an infant manifesting an extremely low response [to blockage and/or high carbon dioxide] would, of course, be greatest if both parents were low responders," the researchers say. "However,... an alternative explanation for the familial clustering of low ventilatory responses to carbon dioxide would be that the low response is determined by a separate autosomal-recessive gene.

"... it seems reasonable to us to suggest that an infant with both low ventilatory responsiveness to carbon dioxide and low responsiveness to flow resistive loads [temporary blockage] will be substantially more likely than the average infant to hypoventilate in the presence of an acute increase in resistance to airflow. This could occur at a susceptible age [SIDS usually strikes from 2 to 4 months of age], during an upper respiratory infection ... due to inappropriate upper-airway muscular relaxation or constriction during sleep."

In a separate investigation of three earlier crib death studies, University of Washington epidemiologist Philip Spiers reports that the syndrome appears to strike more often in the western United States, with a steadily increasing cross-country trend from East to West. In an interview with SCIENCE NEWS, Spiers allows that due to a lack of uniform diagnostic criteria and because of other crib death unknowns, his observations may be less than definitive. Nevertheless, he says the available data used in his study—published in the March INTERNATIONAL JOURNAL OF EPIDEMIOLOGY — do point to a significantly higher western frequency of SIDS.

Spiers speculates the trend may involve a greater "population mix" of different gene types in the West, which he suggests might in some way alter some offsprings' immune or other systems. □

Prize-winning sperm: Raiding the icebox

While it may elicit chilling flashbacks of Hitler's warped visions of a "master race," it is just a "moderately expensive hobby" to 74-year-old California businessman Robert K. Graham. Graham's brainchild is a sperm bank with a rather exclusive list of donors: Nobel-prizewinning scientists. Five laureates—all anonymous except for Stanford University's William Shockley — have already contributed, says Graham, whose venture was publicized last week in newspapers and on national television.

Graham first revealed the project last summer in a bulletin published by Mensa, an organization to which he belongs and which is composed of persons with IQ scores in the top 2 percent of the nation. At the time, he said he was seeking to place the frozen sperm with bright, healthy women under 35 years of age who were married to sterile men. So far, seven women — all on the East Coast — have reportedly received the sperm.

The project, obviously aimed at producing a strain of extremely intelligent children, has predictably drawn sharp criticism from other scientists, humanists and the media; a New York Times editorial suggests that as far as human beings are concerned, "best" is in the eye of the beholder and offers that many women might choose Elvis Presley's genes to Shockley's.

Shockley, who won his Nobel in physics in 1956 but is currently better known for his belief that intelligence is primarily inherited, has said publicly he endorses Graham's effort at "increasing the people at the top of the population." It must also be noted, however, that scientists are unsure how much damage or other alteration genes have undergone by age 70—Shockley's current age. □

Better assay for congenital CMV

Of the three million babies born in the United States each year approximately 30,000 are infected with a virus called cytomegalovirus. Although most of these infants appear perfectly normal at birth, many will go on to develop deafness, growth retardation, learning disabilities and other infection-caused disorders. And to date, there has been no accurate, rapid, convenient and inexpensive test for screening newborns for CMV.

Now an assay that comes somewhat closer to meeting the above criteria is reported in the February PEDIATRICS by Sergio Stagno, assistant professor of pediatrics and microbiology at the University of Alabama in Birmingham, and his colleagues. The assay, surprisingly, is for rheumatoid factor, the antibody that works against antibodies and is known to play a role in rheumatoid arthritis.

Until now it has been possible to diagnose congenital CMV by taking urine from the newborn, placing it in tissue culture and then isolating a virus from the culture. The problems with this test, though, are that there are not many centers in the United States that do it, it is expensive and it takes more than a week to get results. It also has been possible to use an electron microscope to look for CMV in the urine of newborns, but not every hospital has an electron microscope. Some other tests have been available as well, such as the IgM immunofluorescent test, which looks for antibodies of the IgM class directed against CMV. But one of the drawbacks of this assay is that it gives a lot of false positive results (that is, says that CMV is present in a blood sample when it really isn't).

When Stagno and his colleagues read in the medical literature that one of the reasons the fluorescent test gives so many false positive results is that fetuses and newborns with CMV infection produce rheumatoid factor for some reason, and IgM antibodies are reacting against rheumatoid factor rather than against CMV, they checked for themselves and, sure enough, found the factor in the blood of CMV-infected newborns. They reasoned that if the blood of every CMV newborn contained rheumatoid factor, but the blood of non CMV-infected newborns did not, a test for rheumatoid factor might turn out to be an accurate assay for congenital CMV. What's more, the rheumatoid factor test is especially desirable because it can be done in only a minute and is already commercially available at a modest price. Stagno and his co-workers then decided to see how accurate the rheumatoid factor test was for CMV by giving it, as well as existing CMV assays, to a large number of newborns.

The rheumatoid factor assay, they re-

port, produced no false positives, compared with between 3 and 21 percent for other methods. The rheumatoid factor also correctly identified 40 percent of newborns with CMV infections, which compared favorably with some other tests that were as low as five percent but did not compare favorably with several others that were as high as 92 percent. So the rheumatoid factor test appears to be a quick, convenient, inexpensive and moderately accurate assay for congenital CMV, Stagno and his colleagues conclude. They see it providing pediatricians with one more tool for pinpointing congenital CMV infections, particularly in large numbers of asymptomatic neonates.

Even if all CMV-infected newborns were rapidly, conveniently and accurately identified, though, it would not mean that they would be successfully treated. No drug has been found that is both effective and safe against CMV. Nonetheless, rapid, convenient, inexpensive and accurate identification would have some value. It would alert medical staff and parents that a child might later in life acquire CMV-triggered disorders, notably hearing loss. That way a victim might be outfitted with a hearing aid before he or she fell behind in learning because of undetected deafness. Or if other disorders developed, a battery of time-consuming and costly diagnostic tests could be avoided because the cause of the possible disorders would already be known. □

A mammoth Soviet clone?

Soviet scientists would like to clone a mammoth. The current object of their attention, according to the March 4 New York Times, is Dima, the frozen baby mammoth discovered in an ancient Siberian riverbed in June 1977 (SN: 3/18/78, p. 167). Viktor M. Mikhelson, a research scientist in Leningrad, says that Soviet scientists are examining tissue samples from Dima for living cells or cells that were not damaged when the animal froze about 40,000 years ago. If living cells are isolated and if they can be cultured, says Mikhelson, a mammoth cell will be combined with a sex cell from an elephant. In a technique similar to that used to clone frogs, but not known to be successful with mammals, the nucleus of the elephant cell — probably an egg — would be removed and replaced with the nucleus of the mammoth cell. The altered egg would then be implanted in an elephant's uterus and, it is hoped, would yield 18 to 20 months later the first mammoth in 10,000 years. Previous Soviet attempts to culture cells from frozen mammoths have been unsuccessful. But a group of scientists has been set up by the Soviet Academy of Sciences to obtain candidate cells as soon as a mammoth is found. □

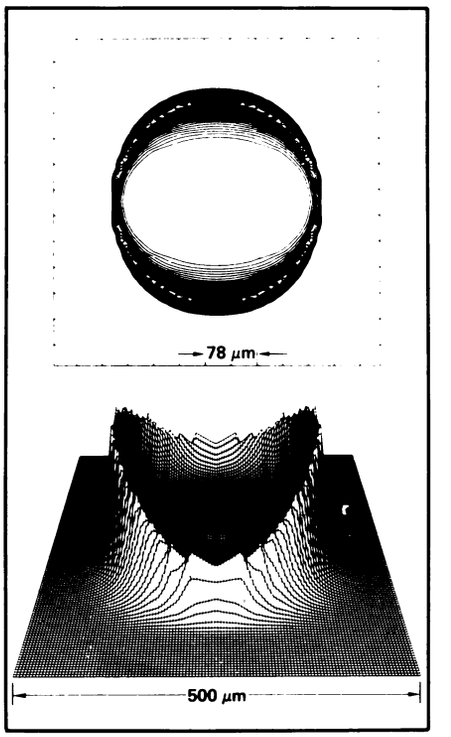
X-rays from a fusion implosion

The fuel pellets that are crushed by laser light in thermonuclear fusion experiments disappear in an extremely short puff of time. They are extremely small, too. A characteristic diameter is about 300 micrometers, a third of a millimeter. Determining the best way to do it requires an understanding of the details of the temporal and causal sequence of events in an action so transient in space and time. Much effort and expense has gone into computer programs that simulate these sequences of events. Now the computer program and the choices it has recommended are being compared with data from the actual experiments, data such as pictures from the implosion.

The pictures are high-resolution images of the suprathermal X-rays emitted in the implosion, the first such from laser-driven targets, according to N. M. Ceglio and J. T. Larsen of the Lawrence Livermore Laboratory, who published them in the March 3 PHYSICAL REVIEW LETTERS. The targets are of the "explosive pusher" type. That is, the actual fusion fuel is surrounded by a substance that readily absorbs energy from laser light and explodes. This drives the implosion of the fusion fuel. The suprathermal X-rays are generated by interactions between electrons with suprathermal energies that have been detached from their atoms in the implosion and the background ions. The X-rays provide information on the mechanisms of production and transport of the suprathermal electrons, and this, in the words of Ceglio and Larsen, is "vital to an understanding of laser-driven implosions." And the X-rays can give a picture of the shape of things at a certain stage of the implosion, the distribution of the relatively cold pusher material in the early stages of the process.

The targets in this series of shots were a mixture of deuterium and tritium gas surrounded by glass microshells, 300 to 325 micrometers in diameter and 1.5 micrometers in thickness. They were irradiated in the Shiva facility by 20 beams of laser light (1.06 micrometers wavelength) grouped in opposing 10-beam clusters. The pulses lasted 90 picoseconds and delivered between 17 and 20 terawatts to the target.

The pictures were taken with a zone-plate camera. They show spatial in homogeneities in the production of the suprathermal electrons and evidence that the pusher breaks up in an asymmetric way in the early stages of the implosion. Both these findings could influence future decisions on shapes of targets and the arrangement of the irradiating beams. The pictures also appear to agree qualitatively with simulations of the same stage of things by the LASNEX computer program. □



Life imitates art. These are pictures of the early stages of the implosion of a laser-fusion fuel pellet. Upper images are of "suprathermal" X-rays produced in the implosion. Lower are three-dimensional representations of the information. They show the general distribution of "pusher" material, material from the outer shell of the fuel pellet. Top box shows how the LASNEX computer program drew it up before hand; lower box, real life. Life is not as smooth as art, but the qualitative agreement between the two representations is pronounced "good" by the experimenters.