

of Yale-New Haven Hospital between 1968 and 1977. The study focused on electroencephalograph (EEG) and IQ measures of 22 patients who had been the child or younger member of an incestuous relationship.

The study was undertaken because Davies and his colleagues had been "struck by EEG abnormalities" in several patients in treatment who had been incest victims, he said in an interview. "Although much has been written about the psychodynamics and family dynamics of the individual involved in incestuous relationships, there has been little documentation of neuropsychological factors that may play a role," he explains.

Of the 22 former incest victims, Davies found that 17 had abnormal EEG's (which were taken routinely after the patient's admission); of these, six suffered actual seizures. This 77 percent incidence compares with a 20 percent incidence of abnormal EEG's reported in a 1965 study of all patients admitted to the hospital unit, and with estimates of from 5 percent to 30 percent among the general population.

In addition, of the 13 study subjects who underwent psychological testing, five showed "dull normal" IQ scores and seven exhibited problems in perceptual motor tasks, concrete thinking and word-finding. In addition, impulsive behavior was reported in 18 of the 22 patients, and depersonalization (feelings of unreality about oneself or surroundings) in 12.

These results, Davies says, suggest that "these neuropsychiatric handicaps create a vulnerability that enhances inappropriate relationships within a family and makes it more difficult to resist an incestuous relationship." He notes that such EEG abnormalities "are frequently associated with disturbances in cerebral mechanisms in the temporal and limbic regions which may mediate identity formation and the sense of personal boundaries." This type of problem may translate into a child's increased demands for closeness, which "in susceptible family constellations ... may provide added stimulus for the breakdown of the incest taboo."

The fact that most of the patients tested were admitted for psychosis or depression should not have influenced their EEG or IQ scores, Davies says, although he adds that "some" brain wave abnormalities have been associated with schizophrenia. He also notes that nearly all the subjects came from middle class New Haven families and were not subject to other forms of abuse, as has been found with incest victims from other backgrounds, and which conceivably might contribute to neurological deficiencies.

"We're not saying the kids are at fault, or the adults not at fault," he says. And it is "unlikely" that such factors "are either necessary or sufficient for incest to occur," Davies says. But he adds that "they may underlie and augment" other family problems that contribute to incest. □

OCTOBER 13, 1979

Negative emotions and cancer survival

"Let it all hang out," may be good advice as far as cancer survival is concerned. A half-dozen studies conducted by various investigators from the 1950s to mid 1970s showed that cancer patients who are able to externalize negative emotions live longer than do cancer patients who suppress their feelings. And now these findings have been confirmed one more time by Leonard R. Derogatis and his co-workers at Johns Hopkins University School of Medicine in Baltimore. They report their findings in the Oct. 5 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

Derogatis and his team studied 35 women receiving drug treatment for spreading breast cancer. Each patient completed self-report inventories on psychological symptoms and moods. Each patient was also analyzed psychologically and had her medical history, such as previous therapies, sites of spreading cancer tissue and current response to therapy, recorded. The patients were then followed up in subsequent months to record their rates of survival. Whereas 13 of the patients lived a mean of only 8.6 months, 22 had survived, as of July 1978, a mean of 22.8 months — a highly significant difference. So the researchers labeled the former patients short-term survivors and the latter patients long-term survivors and then compared the results of each group's psychological tests and interviews.

Derogatis and co-workers report that long-term survivors had revealed, on the symptoms test, significantly higher levels of anxiety, hostility, alienation and other negative emotions than had short-term survivors. Similarly, long-term survivors had manifested significantly more negative moods than had short-term survivors. As for the results of psychological analysis, the long-term survivors had been found to possess significantly more negative attitudes toward their illnesses, their physicians and their treatments than had the short-term survivors. Derogatis and his colleagues conclude that cancer patients whose coping styles facilitate external, conscious expression of negative emotions and psychological distress appear to survive longer than do patients whose coping styles involve suppression or denial of psychological distress.

For this conclusion to be valid, of course, it is necessary to rule out any possible physical explanation for why certain of the patients survived a much shorter period than did others. Derogatis and his team have attempted to do so. They examined the medical histories of their subjects and were not able to find any statistically significant differences in physical characteristics between long- and short-term survivors. What's more, at the time of their psychological testing, the two groups did not show any significantly different response to antitumor therapy. In

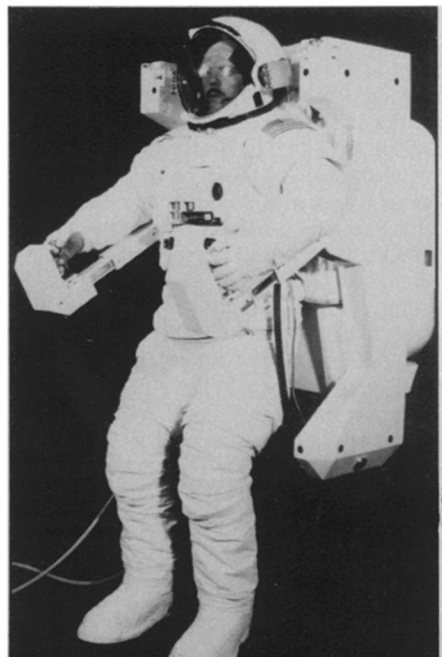
fact, the short-term survival group had been getting drug therapy somewhat longer than had the long-term survival group — exposure that should have increased survival, not shortened it.

The crucial question now is how expression of negative emotions physiologically boosts survival among cancer patients. It is well established that hormones influence tumor growth, and links have been made between psychological factors and hormone status. So it is conceivable that venting negative emotions could alter hormone levels, which in turn could cause a breast tumor to regress, particularly if therapy was applied at the same time. □

Backpack planned for shuttle tile repair

One of the problems causing delays and increased costs during development of the space shuttle has been with the layer of heat-resistant tiles designed to protect the craft from the high temperatures of reentry through earth's atmosphere. If individual tiles become detached or severely damaged during the launch ascent (some have come off while the shuttle was being transported through the air atop its 747 jet carrier), the greater heat of reentry could cause serious problems by burning through the exposed aluminum skin underneath. The National Aeronautics and Space Administration thus announced last week that it is hastening development of a backpack-type maneuvering unit so that shuttle astronauts will be able to move around their vehicle in orbit to inspect and repair damaged tiles.

The device, an outgrowth of earlier versions tested in the Gemini and Skylab programs, is being planned for a variety of shuttle tasks—deploying payloads, checking instruments, etc. — but its development is now being accelerated by "several



months" so that it can be ready by next August. This may not be soon enough for the shuttle's first orbital flight, however, which NASA says "is anticipated between the end of March and July 1980." The agency believes that inspection and repair of tiles will not be necessary on the first flight, which has been "designed to cause lower than normal stress." Also, tests of the tiles will soon be conducted on F-15 and F-104 jet aircraft in maneuvers intended to expose the tiles to dynamic pressures up to 1.4 times as great as those expected for shuttle operations.

Another in-orbit tile-inspection method under study is the deployment of small "satellite" TV cameras from the shuttle, after which the craft would fly around them to expose different parts of its surface to view. □

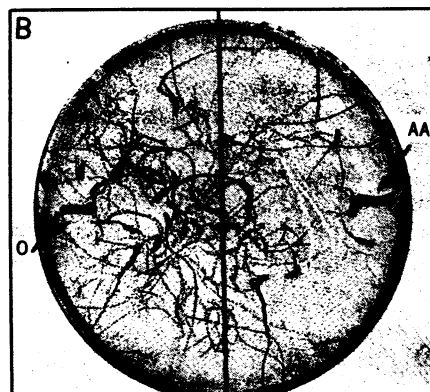
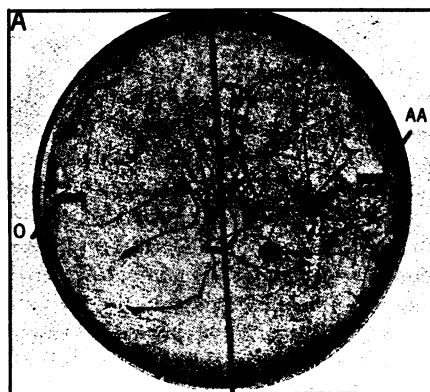
Flies are never too young to learn

The simple brain of an immature fruit fly can grasp the association of an odor and an electric shock — unless, of course, the larva comes from the family lines named dunce, turnip or cabbage. Only a few years ago scientists devised a scheme to show that adult fruit flies (*Drosophila melanogaster*), the geneticists' favorite organism, are capable of learning and that scientists are capable of detecting and measuring the flies' abilities (SN: 6/15/74, p. 391). The testing scheme involves administering an electrical shock simultaneously with a whiff of an odorant. Given the choice of that scent or of one not associated with an electric shock, most fruit flies move toward the innocuous scent.

But adults have no monopoly on learning ability and may not be the most convenient stage of development to study, Efrain O. Aceves-Piña and William B. Quinn of Princeton University now report. The worm-like, immature form of the fly, which later undergoes extensive metamorphosis, can discriminate odors, respond to electric shock and learn to associate the shock with odors nearly as well as do its elders. Thus the structures involved in learning are already present in the simple larval brain.

Not satisfied to observe learning, the geneticists, in their customary style, sought flies with slight genetic variations that create non-learners. Among the adults, they found three such learning-deficient mutants, which they named dunce, turnip and cabbage; another mutant fly called smellblind simply does not respond to odors. Such learning-deficient flies give scientists the opportunity to pinpoint biochemical and anatomical sequences that are necessary for normal learning behavior.

The mutations that produce dunce, turnip and cabbage flies also function in



Larvae trained to avoid the odor of 3-octanol (O) trek to the right side of the plate, while those trained to avoid the amyl acetate (AA) odor move to the left. The dotted lines are larval tracks.

the larval stage, Aceves-Piña and Quinn find. The larvae with those mutations can sense odors and respond to electrical shock, yet fail to learn to avoid an odor that is associated with a shock. The scientists had expected larvae with the smellblind mutation to be able to sense odors because the olfactory end organs are sloughed off during metamorphosis and replaced in the adult fly with receptors of a different type. Instead, smellblind larvae are as insensitive as smellblind adults. The researchers suggest that either both receptor types require the normal gene product or that the mutation disrupts olfactory information processing not at the receptors but in the brain.

Although immature flies may be adequate learners, their memories are not as efficient as those of adults. The larvae forget the odor-shock association within 30 minutes, whereas adults remember their experiences for 1 to 6 hours. "We believe that the difference between larval and adult retention spans is probably intrinsic and that the lengthened adult span results from anatomical or metabolic changes in *Drosophila's* nervous system during metamorphosis," Aceves-Piña and Quinn say in the Oct. 5 SCIENCE. The biologists were unable to learn whether genetic traits for poor memory extend from the adult to the larval brain. Even normal larvae forget as

fast as do those adults considered to be amnesiacs.

Because larval brains are simpler, more compact and easier to isolate than are adult brains, researchers may now shift their search for the anatomical and biochemical elements of learning to the larvae and work on teaching very young *Drosophila* old tricks. □

Estrogen therapy: Still deliberating

Several hundred physicians, scientists and concerned citizens gathered in mid-September at the National Institutes of Health for a Consensus Development Meeting on the subject of estrogen replacement therapy for post-menopausal women. The consensus, unfortunately, was that no one knew enough about estrogen's effects to issue any hard-and-fast recommendations. But the panel did summarize the known risks and benefits of estrogen therapy, and in the process provided some general guidelines for its use.

Overall, the panel advocated a policy of "lowest dose for the shortest time" for women whose menopausal symptoms are severe enough to warrant estrogen therapy. The note of caution was sounded not only because much remains to be learned about the hormone, but also because its users are subject to a two-to-twelve-fold increased risk of endometrial cancer. This danger, which increases with the length of treatment, is generally acknowledged to be the best-documented risk of estrogen therapy. Some researchers found an increased incidence of the disease among users after only six months of the hormone therapy; others extended the "safe" period to five years. The difference in time span as well as the wide variation in increased risk factors is attributed to different research methodologies. The panel judged the time span after which risk increases to be from two to four years.

The increased risk of cancer associated with estrogens, however, does not linger indefinitely. Barbara Hulka of the University of North Carolina at Chapel Hill reported that a two-year estrogen-free interval reduces the risks to normal, non-user levels. Hulka pointed out that this is a very short interval in which to eliminate the hazard of a presumed carcinogen; after five years of abstinence, cigarette smokers only lower their risk by one-half — still far higher than the risk for non-smokers.

The benefits of estrogen replacement therapy are as well-documented as the risks. Estrogens are effective in preventing vasomotor flushes (commonly known as hot flashes); they do overcome vaginal atrophy, which produces symptoms of dryness, itching and pain during intercourse; they do retard osteoporosis, the decrease in bone density that occurs frequently in aging women.