Biology

Julie Ann Miller reports from Minneapolis at the annual meeting of the Society for Neuroscience

Brain tissue grafted across species line

Q: Can mouse neurons survive and function in the brain of an adult rat?

A: Yes.

Not many scientific presentations begin with such a definite and succinct statement, but scientists at the University of Lund in Sweden are quite confident of their results demonstrating the brain's protection against immune system attack. Ulf Stenevi, Fred H. Gage and colleagues report on transplantation, with no immunosuppressive treatment, of embryonic mouse brain tissue. They found 10 out of 18 rats supported a mouse tissue graft for at least six months. In eight cases the graft sent copious nerve fibers into the adjacent brain regions, and mouse nerve cells migrated deeply into the rat brains. Transplanted mouse tissue seems as effective as rat tissue in correcting a surgically produced motor defect in a condition resembling Parkinson's disease (SN: 11/20/82, p. 326).

Similar success was reported by William J. Freed, Richard Jed Wyatt and colleagues at St. Elizabeth's Hospital in Washington. They achieved brain tissue transplants between two strains of rats where skin grafts, for instance, would be rejected. The scientists later transplanted skin from the second rat strain to a rat hosting a cross-strain brain tissue graft. Both skin and brain tissue were then rejected. "The skin graft canceled the immunological privilege of the brain graft," Freed says.

Cells with an appetite

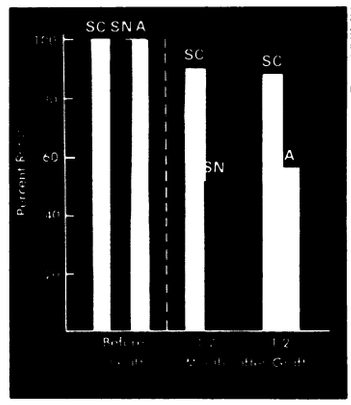
By determining characteristics of individual brain cells involved in feeding behavior, scientists hope to gain understanding of eating and its control. Many cells in the brain area called the hypothalamus receive input from taste sensors and, in experiments with monkeys, for example, respond to sugar water placed in the mouth but not to saline or plain water; neither do the cells respond when the monkey simply moves its mouth. Edwin Rolls of Oxford University now describes cells with even more intriguing characteristics. They seem to be involved with the *motivation* to eat. Rolls reports that these cells, also in the hypothalamus, respond only when the monkey is hungry, but not when it is satiated. These brain cells begin to respond as soon as a monkey sees the syringe holding sugar water, or even a symbol that the monkey has learned means it will be allowed to eat. And the cells continue to respond while the monkey eats. Some of these cells respond with increased impulse firing; others respond with a decrease in firing rate. Most of the cells react only to the prospect or act of eating. However, some respond instead to water and the prospect of drinking, and a few cells respond to both water and food. Rolls reports further support for a motivational role for these cells. In a monkey satiated on sugar solution the cells no longer react to the sight or taste of sugar. But at the sight of a peanut they will begin responding again.

Brain in the eye

It is a challenge to isolate parts of the brain for study but still to have them in an environment where they will develop and function normally. Ake Seiger meets that challenge not by putting nerve cells into laboratory culture but by transplanting them into the eye of a host animal. The transplant, about 2 millimeters in diameter, is inserted through a slit in the cornea, which heals quickly. The graft sits on the outer surface of the iris and benefits from the blood supply of the recipient mouse or rat. The transplant is visible on the iris, and scientists can record its electrical activity by folding back the cornea. In experiments at the Karolinska Institute in Stockholm, brain regions — cerebellum, hippocampus and cerebral cortex — have been grown alone or combined. Seiger finds the technique "a profitable way of dissecting questions of normal and abnormal development."

Behavior

Transplant 'em while they're young



Substantia nigra (SN) and adrenal gland (A) grafts both reduced Parkinson-like rotational movements in rats by providing dopamine to deficient brains. A control group with sciatic nerve (SC) implants did not improve.

One of the relatively unexplored keys in successful brain grafts involving Parkinson's disease sufferers and other victims of serious brain disease or damage may lie in the age of the grafted cells. While transplant of dopamine-producing tissue into the brains of rats with induced parkinsonism has been highly successful, similar operations with monkeys and one with a human patient in Sweden have met with far less success (SN: 11/20/82, p. 325). Part of the reason for this discrepancy may involve the age of the donated tissue. In the vast majority of the successful animal trials, the implanted substantia nigra or adrenal gland tissue came from embryonic or very young rats. In the human procedure, the 60-year-old man's own adrenal gland was grafted onto his brain. This may indicate that the younger the source of the graft, the greater chance for success, says William Freed, who worked on the rat experiments at the National Institute of Mental Health.

But the evidence is more than circumstantial. In his report at the recent Council for the Advancement of Science Writing meeting in Cambridge, Mass., NIMH's Richard Jed Wyatt said that grafting the substantia nigra from a 17-day-old rat fetus — in addition to alleviating Parkinson symptoms — seemed to protect the region of the implant in an adult rat from the effects of a natural degenerating substance that is produced as the brain gets older. In addition, Freed told SCIENCE NEWS that in yet-to-be-published research, the NIMH researchers found when they used older donors in the rat transplants, the Parkinson symptoms were *not* alleviated. "We have to figure out the importance of age in the donor," said Freed.

'Faking' psychosis: Real consequences

Psychiatrists have identified a group of individuals who want to assume the role of patient so much that they feign psychosis. Such people have been recognized in isolated instances at psychiatric hospitals and have been observed individually and reported on anecdotally. Now, perhaps the first systematic study of these patients has been reported by Harrison G. Pope and his colleagues at McLean Hospital in Belmont, Mass.

The psychiatrists found that though the bases for the symptoms may not be genuine, the end results of "factitious psychosis" are all too real. In the nine patients studied (representing about 4 percent of the 219 patients screened) with definite factitious psychotic symptoms, the researchers found that "the prognosis . . . is poor — significantly worse than in comparison manic or schizoaffective patients [with both depressive or manic *and* psychotic symptoms] and even slightly worse than in comparison with patients with schizophrenia." Their report appeared in the November AMERICAN JOURNAL OF PSYCHIATRY.

Eight of the nine patients studied spent "months or years" in mental hospitals during the follow-up period; four were hospitalized at the time of follow up and one had committed suicide. Say the researchers: "On the basis of this preliminary study, it appears that acting crazy may bode more ill than being crazy."