SCIENCE NEWS of the week

Stitchless Junction Supports Healing Nerves

The fine sutures of a skilled neurosurgeon can work wonders in repairing blood vessels, but they have been disappointing for splicing nerves cut by injuries. Now scientists report that in experiments on rats, a tailored series of mechanical and chemical techniques can ensure the return of nerve function.

Within any of the nervous system's main trunklines coursing down an arm or a leg, thousands of nerve fibers must reconnect with their specific targets for function to return completely after an injury. Standard microsurgery is so traumatic to the injured nerve cells that "the surgeon is carefully suturing together cadavers," Luis de Medinaceli told a meeting at the National Institutes of Health in Bethesda, Md. Working with William J. Freed and Richard J. Wyatt at St. Elizabeths Hospital in Washington, D.C., he developed a newer, experimental repair method.

To limit physical and chemical damage to the cut nerve cells, de Medinaceli places the nerve stumps in a solution that mimics the fluid inside a nerve. The treatment fluid also contains polyvinyl alcohol to prevent swelling and protein loss and a drug that limits damage by calcium.

The stumps are attached to a small rectangle of rubber for positioning and support. Next they are carefully frozen and trimmed with a vibrating razor blade. Finally the preparation is warmed and the traction on the rubber released, bringing the nerve stump ends into proper contact.

De Medinaceli/Reprinted with permission from EXPERIMENTAL NEUROLOGY, vol. 81 © Academic Press.

A month after nerve injury, the paw of a rat receiving reconnection treatment (left) assumes a more normal position and produces a more normal track than does the paw of a rat treated with the current microsurgical technique (right). In each column, right pawprint is normal.

The rubber support is then folded around the nerve and the wound is closed.

Microscopic observations have shown healthier recovery of reunions by this "reconnection" technique than by microsurgery. The reconnection technique, properly positioning the stumps with minimal scarring, enables each cut nerve fiber to grow across the gap and enter the appropriate "tunnel." These tunnels of insulating envelope and membrane are left by the portion of the nerve cell that, cut off from its cell body, degenerated after the injury. The nerve fiber then grows down the tunnel to its target site on a muscle.

In recent experiments de Medinaceli has looked for recovery of function after the sciatic nerve, a trunk nerve in the thigh, was severed. After a month, only three of ten rats treated with standard microsurgery had any recovery of function. In contrast, all 13 of the rats treated with the reconnection procedure had a normal or almost normal gait, he reports.

Successful experiments with the reconnection technique have been carried out also by Anthony Seaber at Duke University in Durham, N.C., and four other groups have experiments underway.

"There is no acceleration of growth. The whole secret is that the fibers have less chance to get lost," de Medinaceli says. He is currently applying the procedure to monkeys. He says, "If it works on monkeys, it could be sensibly tried in man."

— J.A. Miller

The perils of pandas: Where has all the bamboo gone?

An estimated quarter of China's 1,000 wild giant pandas face a food shortage in the next several years that is a "real emergency," says a leader of field research on pandas. George Schaller, head of the World Wildlife Fund's Project Panda, spoke to reporters during a brief visit to Washington, D.C., between trips to China to investigate this most recent threat to pandas on preserves. Schaller reports that the Chinese government has instituted an extensive emergency plan to try to prevent widespread panda starvation.

Pandas in the wild subsist almost entirely on bamboo, especially during the winter. About half the total panda range will soon have some degree of bamboo shortage, due to the 50-year flowering cycle of two species, Schaller says. When the bamboo flowers, it produces seeds and dies (SN: 7/30/83, p. 69). Young bamboo seedlings are too small to satisfy a 250-pound panda's appetite. It takes several years' growth before bamboo plants are large enough to provide an adequate panda diet.

Providing supplementary food to the wild pandas is difficult because most live in rugged, remote mountain regions. Three rescue methods have been instituted. Villages are setting out meat, maize and sugarcane for pandas that live nearby. Holding stations are being established where starving pandas can be taken for short-term rehabilitation. And plans are being made to capture pandas from famine areas and transport them to habitats that have sufficient bamboo.

The Chinese government has undertaken a massive campaign to urge help for the pandas, Schaller reports. There is a $100 reward (the equivalent of 2 months' salary) for villagers who report and help rescue a starving panda. In addition, each county has a team of four to six people who roam the preserves searching for starving pandas. The World Wildlife Fund has supplied three lightweight cages with which the villagers can carry pandas across the rugged terrain.

The official Chinese news agency has reported that winter wheat will be planted adjacent to panda preserves. But Schaller doubts whether this food will be accessible to the many pandas in remote areas.

So far two starving animals have been rescued, and two pandas have been found dead, Schaller says. "The height of the crisis will be later, next year," he predicts. "Saving the pandas is going to take a major effort continuing at least five years."

The bamboo shortage is not expected to affect captive pandas, which accept a varied diet.

Meanwhile, at the National Zoological Park in Washington, D.C., female panda Ling-Ling is recovering well from a serious kidney ailment that developed late last year (SN: 12/24 & 31/83, p. 405). Zoo officials are uncertain whether she will breed this spring.

— J.A. Miller