RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Brain as a Renewable Resource

When Sam Weiss and Brent Reynolds discovered mouse brain cells that could produce new generations of neurons when they were cultured in the lab, the University of Calgary biologists hoped that their surprising finding might find a use in the treatment of neurodegenerative diseases (*Science*, 27 March, p. 1646). Now CytoTherapeutics, a Providence, Rhode Island, company that develops cell implants to treat diseases, has heightened that hope by signing an agreement with Weiss and Reynolds to probe the therapeutic potential of the brain cells.

Neurons are not normally replaced after damage. That is why the discovery that certain undifferentiated brain cells (called stem cells) could be induced to generate new neurons was thrilling to the neuroscience community. If the cells can be encouraged to grow into the right neuron types, they could be used to replace dead neurons, or to provide substances the absent neurons would normally produce. And that would raise the possibility of a new treatment for diseases such as Parkinson's, Huntington's, and Alzheimer's—a treatment that would not be dependent on the use of controversial fetal tissue transplants.

If similar neuron-spawning cells exist in adult human brains, they might be coaxed to differentiate right in their intracranial home, the Calgary duo suggests. If that effort proved unsuccessful, the cells might be removed, treated, and then put back into the brain. And even if the right cells aren't found in humans at all, cells from other species might be used. In this scenario, though, the cells would be encased in a porous membrane, developed by the founders of CytoTherapeutics, that would allow them to secrete their useful products and receive nutrients, while shielding them from the immune-system attack that normally kills foreign cells.

The Calgary biologists' findings are encouraging, says William Freed of the National Institute of Mental Health, who recently organized a conference on neural transplantation (*Science*, 14 August, p. 868). But Freed cautions that the researchers don't know yet whether the mouse cells form many or only a few neuron types, or whether the types they do form will be the right ones for treating specific illnesses. "The promise depends on what you can get them to do," he says.

NYZS

Collared. Scientists fit the latest in high-tech neckwear on elephant Isabel.

Tracking Elephants by Satellite

Some evenings before turning in, Bronx Zoo mammalogy curator Fred Koontz checks up on Isabel the elephant. No, he doesn't walk to the Elephant House; instead, he uses a satellite to spy on this elephant who lives in the rain forest of Cameroon, 8000 kilometers away. Koontz has been eavesdropping on Isabel ever since 16 June, when she became the first rain forest creature to wear a satellite-tracked radio collar.

Koontz can check in on Isabel merely by logging onto a computer in his home at the zoo and tapping into an Isabel-spotting database. One evening earlier this month, for example, it told him the following: Isabel was alive, and last spotted at Latitude 5.332 degrees north and Longitude 9.4191 degrees east, or squarely within Cameroon's Korup National Park. "Every time I get this data, I get excited," says Koontz, who developed the extra-extra-large radio collar that Isabel wears so her location can be tracked by a pair of National Oceanic and Atmospheric Administration satellites passing 850 kilometers overhead.

The pachyderm still has some privacy: The dense canopy of the rain forest and Isabel's huge body mass apparently absorb the radio signal, blinding the satellites on two out of every three orbits. By contrast, in the wide-open savanna of Zaire, the researchers have had a 94% success rate with another collared elephant, says Koontz. He is now testing a new radio collar on captive elephants at the Bronx Zoo, hoping it will work more consistently in the forest.

Meanwhile, the satellite data are offering elephant-watchers a broader window on how the foraging and migration behaviors of the larger and more numerous savanna elephants differ from those of the smaller, more elusive forest elephants, which make up about one-third of Africa's 700,000 elephants. For example, preliminary data have confirmed that Isabel has a much smaller range—109 square kilometers—than the savanna elephant in Zaire, whose range averages 1300 square kilometers. Such findings should help land managers design conservation areas, says Bill Webber, assistant director of Wildlife Conservation International (WCI). And the satellite also is helping WCI biologist James Powell on the ground in Cameroon study the behavior of the fast-moving Isabel—which is no mean task in a forest with heavy foliage and no roads.

Engineer Creates Mayhem in Montreal

Less than 3 years after an anti-feminist gunman shot to death 14 women engineering students at Montreal's Ecole Polytechnique before killing himself, violent death has returned to the city's academic engineering establishment. On 24 August, Valery I. Fabrikant, 52, a research associate professor in the department of mechanical engineering at Concordia University, allegedly walked into the ninth floor of one of the school's downtown buildings, swept past students in the hallways, and gunned down five people, killing three.

Dead are civil engineer Matthew Douglass, chemist Michael Hogben, and mechanical engineer Jaan Saber. The chairman of the electrical and computer engineering department, Phoivos D. Ziogas, remains in critical condition. Fabrikant has been charged with three counts of first degree murder.

A Russian Jew who immigrated to Canada 12 years ago, Fabrikant had been embroiled in disputes with his department for the past 4 years over matters related to the rejection of his tenure application. In a series of messages he put out on Internet, Fabrikant charged that several Concordia administrators had insisted on co-authorship of scientific papers to which they had not contributed. The university responded with a lawsuit—charging him with libel and harassment of faculty members. Fabrikant was scheduled to appear in court on the day of the shootings.

In a bizarre coincidence, the mechanical engineer appointed chancellor of the University of California, Berkeley, 2 years ago, Chang-Lin Tien, was threatened the day before the Montreal massacre by a machete-brandishing local "activist" who broke into his residence. Tien, a member of the AAAS Board of Directors, escaped unharmed and the 20-year-old intruder, who called herself Rosebud Abigail Denovo, was shot to death by an Oakland policeman.

GAO Bashes SSC Cost and Schedule Claims

When the Superconducting Super Collider (SSC) faced political annihilation in the House earlier this summer (*Science*, 26 June, p. 1752), supporters of the $8.25 billion machine coined a simple slogan for the Senate debate: "The SSC is on schedule and on budget." But a recent analysis by the General Accounting Office (GAO) suggests that no one really knows.

In a report last month to SSC opponent Senator Dale Bumpers (D–AR), the GAO noted that the Department of Energy has failed to implement a system that might provide early warning of problems that could boost the project's cost or stretch out its schedule. Such a system may not be in place until June 1993, and until then, the report states, the agency "cannot assess on a timely basis whether the SSC project has encountered [cost or schedule] problems."

SSC general manager Ed Siskin calls the report "misleading." For instance, he points out that just 2 weeks ago, the SSC laboratory successfully tested a "string" of six 17-meter superconducting magnets—the most technologically challenging aspect of the project—6 weeks ahead of schedule.

SLAC Finally Polarizes Its Electrons

Happy days here again? Not quite, but a recent success should offer some solace to beleaguered researchers at Stanford's Linear Accelerator Center (SLAC).

After several years of experimental disappointments, SLAC was dealt a blow last April, when an expert panel recommended that the lab be closed by 1996 if the Department of Energy proved unable to find the funds for a major new project there (*Science*, 24 April, p. 432). Now, though, the string of bad news has been broken by word that the Stanford Linear Collider (SLC) has become the only accelerator in the world to produce a polarized electron beam—one in which electron spins are aligned with the beam axis. With more than a month to go in the current experimental run, which began in April, Stanford physicists have already exceeded their goal by producing more than 10,000 partially polarized Z^0 particles.

The SLC is unique in that it creates elusive Z^0 particles by smashing together beams of electrons and positrons generated by a 2-mile-long linear accelerator. The machine's intended strength was its precision beam control—an asset that, in theory, was to allow it to collect interesting Z^0 physics from a relatively small number of collisions compared to those necessary at its more muscular competitor, the Large Electron Positron (LEP) ring in Europe. In practice, though, the SLC has slipped far behind LEP because of the technical difficulty of controlling its beams. Which is why staff scientists are so heartened by their current success, which followed the upgrading of some equipment last April.

Their joy may be short-lived, however, as the SLC is scheduled to close down in October 1993. Without another big project in sight, SLAC at best faces a long dry spell—and at worst, extinction.

Indoor Plumbing Wises Up

When Isao Karube flashed a slide portraying his vision of Japan's 21st-century geriatric medical care at an international biotechnology conference held last month in Crystal City, Virginia, it drew chuckles and incredulous smiles from the audience. The slide depicted a man at home sitting on a toilet, which had been rigged with health-monitoring biosensors and linked to a central medical diagnostic center.

Although Karube, a professor of bioelectronics at the University of Tokyo, encouraged the mirth, he says that he, his colleagues, and their supporters in Japan's Ministry of Health and Welfare are perfectly serious. Japan's elderly population is expected to grow rapidly during the next century, and the Ministry is counting on high technology to play a big role in managing the expected increase in health care needs, Karube says. And that could well mean fitting private bathrooms with a benign cousin of Big Brother.

"Japanese people like the idea of intelligent toilets," Karube said (to more chuckles). The concept is to equip them with a battery of biosensors that would automatically monitor urine and feces for certain proteins, sugar, blood, and other health indicators. Sensor data then could be sent by telephone to what Karube called "health check centers" where computers running medical diagnosis programs would flag any signs that might presage illness. A human doctor would then be dispatched to the home of the ailing senior citizen.

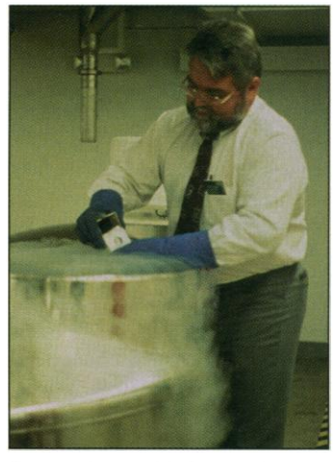
Karube and his colleagues claim that their vision wouldn't be all that costly. They have designed the biosensors so they can be made by processes similar to those for mass-producing microelectronic components—which would make them cheap enough to install in millions of toilets.

Maybe so. But Jerome Schultz, director of the University of Pittsburgh's Center for Biotechnology and Bioengineering, warns that most biosensor ideas end up as little more than that. Manufacturing and marketing difficulties, accuracy problems, and short sensor lifetimes can all flush a good concept away, he said at the conference. "The field is exploding with ideas. Bringing [biosensors] to the point of real, reliable, commercial products is the challenge." If Karube and his colleagues do that, they may get the last, and healthiest, laugh.

Fort Knox of World Food Supply

By 1990, the cryogenic storage tanks at the National Seed Storage Laboratory (NSSL), located at Colorado State University in Fort Collins, had become a victim of its own success: The nation's only long-term seed storage facility, it had banked roughly 232,000 seed samples since its birth in 1958, and then about 2 years ago, says Steve Eberhart, its director, "We simply ran out of space." The squeeze-out meant that fires, floods, tornadoes, pollution, disease, insects, terrorists, microbial attacks, or other enemies of vegetable life could wipe unarchived crops, and their seed-borne genetic keys, off the face of the earth.

Breathe a sigh of relief. On 18 August, representatives from the university, Capitol Hill, and the Department of Agriculture dedicated a $10 million, 65,000-square-foot expansion to the facility's original 20,000 square feet of vaults and office space. The additional space means 1 million germ plasm samples, more than four times the facility's present capacity, will be available to farmers and researchers desperate to resurrect a lost food, fiber, or crop. With a precious charge like that, NSSL administrators didn't want to take any chances. The facility has been designed to withstand anything nature chooses to deal it, including earthquakes, major flooding, or even the force of tornados.



Dearer than gold. Cryogenic seed storage vats at Fort Collins.