

years, the last in July 2003. Before her transplant, diabetes was consuming her life and complications were piling up. “I was losing hope,” she says. Now, despite drug side effects that include anemia, she feels vastly more optimistic.

“It’s striking how many patients ask for a third transplant,” says Senior. “Even with all the side effects and all the downsides, they still think it’s a good thing.”

And so Edmonton, like many other islet-transplant centers, continues to grow. Today, more than 25 hospitals have performed islet transplants that hew closely to the Edmonton protocol. NIH will soon announce \$75 million in awards for a new clinical islet transplantation consortium in which centers will collaborate on islet studies. Although Harlan ended his islet-transplant trial early, the agency believes the treatment is worth pursuing. “This is not a black-and-white issue,” says Allen Spiegel, director of NIDDK.

#### Roadblocks to expansion

New money, however, will go only so far: Islet transplants are extraordinarily expensive, costing up to \$200,000 in the United States for one patient in the first year. Anti-rejection drugs add another \$30,000 annually after that. At centers like Miami, where most patients remain part of a protocol, the price of success—of supporting patients for years after a transplant—is becoming prohibitive, says Rodolfo Alejandro, an endocrinologist and director of the clinical islet-transplant program at the University of Miami. (Costs in Canada are somewhat lower because there’s no charge for organs, and the Alberta health care system agreed in 2001 to pay for transplants for Alberta residents.) Because they’re still considered experimental, most United States islet transplants are funded by NIH, JDRE, and sometimes by pharmaceutical companies that manufacture immunosuppressants.

Costs are one roadblock to performing the kind of large, controlled studies that some say are needed before islet transplants can shift from being an experimental therapy to being one approved by the U.S. Food and Drug Administration (FDA). Some islet transplanters, like Alejandro, believe that one option is for FDA to approve the therapy under its existing “orphan drug” category, making it available to essentially the same patients getting islets now—those with uncontrolled diabetes. That way, it could be covered by insurance. A year ago, FDA held a public advisory committee meeting in Gaithersburg, Maryland, and agency officials made clear they want certain issues addressed first. Those include consistency in how islets are processed and a better assessment of the risk-benefit balance.

No matter how FDA rules, major hurdles

stand in the way of islet transplants going mainstream. First, the shortage of donor pancreases means scientists must find a renewable source of islets. One popular option would involve using some type of stem cell. This year, JDRE has committed more than \$8 million to stem cell research, more than \$6 million of it to human embryonic stem cell work. Yet creating islets from stem cells isn’t imminent, according to Larsen and other transplanters.

Milder immunosuppressive regimens might come more rapidly. One study that’s

gearing up at Miami calls for giving islet recipients a dose of bone marrow cells culled from the donor’s vertebrae, to try to help patients better tolerate the islet cells.

Current islet recipients, and the many more people with diabetes hoping for a transplant, are eagerly awaiting the day when islet transplants are easier to come by and gentler to receive. But Berty remains upbeat. A book she’s written chronicling her experience came out this spring. Its title: *I Used to Have Type 1 Diabetes: Kiss My Islets*.

—JENNIFER COUZIN

## Research Community

# Science Weathers the Storms

Researchers struggle to keep their work on track in the wake of recent hurricanes

On a small beach in southeastern Florida near Fort Lauderdale, marine biologist Jeanette Wyneken races to collect as many loggerhead sea turtle nests as possible before the full brunt of Hurricane Frances hits. She fills her car with all she can carry and records the GPS coordinates of the nests she must leave behind, hoping that they will still be there when she returns. Her efforts are not entirely selfless, though: She’s also guaranteeing that, while the storm wreaks havoc outside, her research on a threatened species can continue in the lab.

Wyneken—like many scientists at southeastern universities and institutions—faced a rare challenge in this season’s record string of hurricanes. Many had to battle power outages, flooding, and even police barricades to keep their work on track. Not all succeeded. The hurricanes—Charley, Frances, Ivan, and Jeanne—destroyed sensitive equipment and reagents, set back research, postponed conferences, and forced the extension of grant deadlines. This chain of storms “has been a huge disruption,” says University of South Florida oceanographer Frank Muller-Karger, whose St. Petersburg lab had to move its computers into bathrooms to avoid losing data when Charley hit. “It’s been an incredibly stressful period.”

At Cape Canaveral, even before Frances began pounding the beaches, scientists at the Kennedy Space Center faced some tough choices. “Packing our spacecraft up would set the launch date back at least 2 weeks and cost a couple million dollars,” says Neil Gehrels, who heads NASA’s Swift gamma ray observing satellite project. But he was loath to take a chance, because “NASA is very cautious with its equipment.”

In the end, Gehrels instructed his team to seal the satellite in an airtight metal container and move it to a secure hangar. His prudence proved correct. The space center took a direct hit from Frances, suffering the worst damage since it was established in 1963. Even though the launch date was delayed by the move and subsequent evacua-



**Space scuttle.** Hurricane Frances shredded the walls of a Kennedy Space Center building used to assemble shuttle parts.

tion of personnel, Gehrels says the alternative would have been much worse. “Swift would have taken 5 years to rebuild,” he says, “to say nothing of the cost.”

Packing up and evacuating wasn’t the preferred option for all southeastern scientists, however. When Hurricane Ivan looked like it



**Storm survivors.** Marine biologist Jeanette Wyneken made a risky trek to supply her loggerhead turtles with fresh seawater after Hurricane Frances knocked out power to her lab. Later, she released hatchlings from nests she had saved from the storm, just days before Hurricane Jeanne struck.

was on a collision course for New Orleans, Tulane University parasitologist Paul Brindley decided to move his wife and 9-year-old daughter into his lab on the fifth floor of the university's environmental research building. "We thought we'd be safer hunkered down there than at home," he says. Brindley brought beans for his family to eat and air mattresses for them to sleep on and kept his daughter calm by letting her play games on his office computer. Meanwhile, he ventured into his workspace to transfer his schistosomes to liquid nitrogen and plug his freezers into backup generator outlets—just in case.

A backup generator was the first thing to go at the University of Florida, Gainesville, biochemist Arthur Edison discovered when he got a frantic call at 3 a.m. on the morning Frances struck. Edison runs the university's Advanced Magnetic Resonance Imaging and Spectroscopy Facility, which relies on a \$2 million system of superconducting magnets to study everything from structural biology to Alzheimer's disease. "The magnets need power to stay cold," he says; otherwise, they can fail in 8 hours. Edison had to wait until morning to check on the magnets because the town was flooded and under curfew. When he entered the building under police escort, he discovered that the entire institute was on the fritz. "The whole place was beeping," he says.

Edison's magnets were fine because they never lost power, but other equipment had failed. He spent several hours plugging powerless machines into working outlets and moving his colleagues' sensitive reagents from dead freezers into working ones. Still, it could have been worse. Remembering how

Tropical Storm Allison drowned more than 35,000 lab animals at Baylor College of Medicine in Houston, Texas, in 2001, Edison and others had spent the days before the hurricane sandbagging doors and taping windows shut.

While some were trying to keep water out of their labs, Wyneken was trying to bring it in—hoping to save her loggerhead turtles. Hurricane Frances had knocked out the power to the pumps in her building at Florida Atlantic University in Boca Raton, stopping the flow of fresh seawater to the turtle tanks. Rather than risk using contaminated water from the nearby beach, Wyneken made a 72-kilometer trek up the coast to fill the 50-kilo containers in her truck with water from the Juno Beach Marine Life Center. On the way back, she had to get special permission to cross closed bridges and hiked through a carpet of downed ficus trees.

Many graduate students undertook similar physical risks to keep from losing thesis projects they had spent years working on. When Hurricane Ivan veered toward the Alabama shoreline, Charlyn Partridge, a biology Ph.D. student working at the University of South Alabama in Mobile, ignored her parents' pleas to seek shelter at their home in Louisiana. Instead, she headed straight for the basement of the university's life sciences building. While the Federal Emergency Management Agency set up shop on the first floor, Partridge dissected her pipefish to collect the daily readings she needed for sexual selection studies. "If I had missed a day, I would have lost a month of work and may not have been able to finish my project on time," she says. Partridge

acknowledges that she took a risk by going to the lab. "But you need to make sure everything that's important to you is safe," she says. "That also includes the research."

Although no one welcomed the storms, some research actually benefited from them. Hurricane Charley damaged sensors on marine research buoys being used by University of South Florida oceanographer Robert Weisberg, but he left equipment running when Frances hit. "As a result, we got a really nice data set," he says. "And it was totally unplanned." Weisberg says that, although Frances caused some damage, sensors recorded changes in water temperature and current that will eventually be assimilated into models that may help improve hurricane forecasting.

Wyneken is beginning to see a bright side as well. The first eggs she saved on the beach have begun to hatch, and she believes she will be able to collect good data on how young turtles adapt to their environment. "Sometimes you have to do some crazy things for science," she says. "But when you see a whole nest of baby turtles hatching ... with their big brown eyes and big floppy feet, it makes all of your efforts and hassles seem worthwhile."

Wyneken's turtles are still going to need some luck. In the coming weeks, she will tag them for further study and release them onto the now-damaged beach where she rescued them. Once they make their way back to the water, they'll contend with predators, starvation, and—as Hurricane Jeanne made clear last week—a storm season that is far from over.

—DAVID GRIMM

With reporting by Sean Bruich.