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THE LONG JOURNEY

White, retired. The *Roe v. Wade* decision—the legal basis for a woman's right to choose—would then be in danger.

While *Roe v. Wade* survived, it was still possible to do fetal-tissue transplants in the United States using private money. Eugene Redmond's group at Yale and Curt Freed's in Colorado had somehow managed to put together privately funded programs. If *Roe v. Wade* fell, their fate would be left in the hands of state lawmakers. If Connecticut's or Colorado's politicians chose to make abortion illegal, then those programs would have to shut down or move to a state which continued to permit abortion.

Both groups had inquired about doing fetal-tissue transplants on Langston's MPTP patients. The idea was very tempting. It was much simpler to fly a patient to Colorado than halfway around the globe to Sweden. But despite the logistical difficulties, Langston had no doubts that George and Juanita would be getting the best possible chance at Lund. No group anywhere in the world could compare in experience to the Swedes—neither the Yale nor the Colorado group had been grafting human patients when Langston met Björklund on the bus in Belgium.

The Swedes had now done a total of four human cases. The two female patients who received fetal-tissue grafts in 1987 had continued to improve modestly. In April and May of 1989, the Swedish team had carried out two more fetal-tissue transplants. The first of these was a 49-year-old man who had been diagnosed with Parkinson's disease in 1977. His main problems were rigidity and bradykinesia in his right arm. This patient received a unilateral fetal transplant, using tissue from four fetuses, into the left putamen in an attempt to compensate for the symptoms on his right side. The second patient was a 59-year-old man who had been diagnosed with Parkinson's disease in 1982. His main problem prior to surgery was left-sided rigidity and bradykinesia. He received tissue from four fetuses grafted into the right putamen, to compensate for symptoms on his left side. Prior to surgery, both patients had

California Parkinson's Foundation, August 13, 1989

Langston watched as Dr. Håkan Widner did a final evaluation of George. In a few hours George would be in the air, bound for Sweden. If everything went well with him, Juanita would fly to Sweden in about a month.

A great deal was at stake. For over a year and a half, a federal funding ban on fetal-tissue transplants had effectively killed off U.S. research in this area. Despite the outcry among doctors and patients, despite the recommendations of Judge Adams's fetal-tissue panel, the Bush administration had held firm. Passionately anti-abortionist, they saw themselves fighting a holy war. It was a war they seemed to be winning. They had cut off federal funding for abortion counseling. They had openly declared their intention to appoint pro-life justices to the Supreme Court as soon as some of the very elderly incumbents, like Justices William J. Brennan Jr., Thurgood Marshall, and Byron

suffered with fluctuations between on and off states for three or more years.

It was much too early to know whether these transplants were successful. But it was reassuring to Langston that the team had successfully carried out the surgical procedure, with the complicated planning and logistics of procuring the fetal tissue, on two more patients.

While the Swedish group had only carried out four human cases, this clinical work was founded on decades of basic research in animals. In this respect they were unique. If he had needed a fetal-tissue transplant for himself, Langston would have it done in Sweden.

Langston had been amazed at Håkan Widner's dedication and persistence. For a year and a half, Widner had regularly come out to California and spent time in prisons and halfway houses with criminals and drug addicts, all in the name of science. He had done an incredible job setting up the scientific protocol and getting the vital baseline data on what George and Juanita could do before surgery. If George and Juanita got better, Langston thought, he really had the Swedes in general and Widner in particular to thank.

The meeting on the bus in Belgium had given birth to a great idea, but putting the idea into practice had taken years of planning. First there was the problem of paying for the operations. Langston had gone to all four of the Parkinson's disease foundations, asking each for a contribution of ten thousand dollars. Despite their professed interest in the project, only one foundation had contributed funds—the New York-based Parkinson's Disease Foundation. The others all found reasons for not supporting the research. Having been burned by the adrenal tissue fiasco, the United Parkinson's Foundation argued that the transplants were premature. The American Parkinson's Disease Association turned Langston down, saying they were worried about liability issues if something went wrong. The Miami-based National Parkinson's Foundation group refused Langston's request because, they said, their board was concerned about possible negative publicity.

The Dystonia Research Foundation of Canada agreed to fund the Canadian part of the project—the PET scans in Vancouver.

The bulk of the money for George's and Juanita's operations came from Sweden. The Tricentenary Fund of the National Bank of Sweden, the Swedish Medical Research Council, and the Westerström Foundation all made significant contributions. The biggest component—the hospital costs—were absorbed by Lund hospital, which agreed to treat George and Juanita as if they were Swedish nationals and therefore entitled to free medical care.

Then there had been the ethical review. The protocol had to be passed by human subjects review boards, not only in Lund but also at Santa Clara Valley Medical Center.

Everything had been done carefully by the rules. But Langston was desperately worried about the fallout should something go wrong. These patients were by now famous. Among neuroscientists they were celebrities, known by their first names. Scientifically speaking, George and Juanita were precious resources, not to be squandered lightly. Their personal tragedy had led to a continuing scientific revolution; if something happened to them it would be both a personal and a scientific tragedy.

If anything went wrong, if George or Juanita suffered any ill effects from the operations, if either of them died, the Swedish-California team would be severely criticized. People would say that the operations had been premature, that they should not have risked the lives of such valuable patients, that they had acted unethically.

If the popular press took hold of the story, the situation might be even worse. They were about to send a pair of former drug addicts with criminal records halfway round the world to Sweden, to receive tissue transplants from the brains of aborted fetuses. Tens of thousands of dollars would be spent in this effort to restore George and Juanita, and for what? Langston could just imagine the headline: SWEDISH SCIENTISTS USE ABORTED FETUSES TO SAVE DRUG ADDICTS.

While George rested, Langston and Widner reviewed the elaborate travel arrangements. The biggest issue was George's medication. If George was allowed to take L-dopa, there was a very good chance that he would have terrible hallucinations and wild dyskinesias during the trip. If he started seeing snakes and fire at thirty-five thousand feet over the Atlantic, it would be a disaster. Langston had nightmares of the pilot having to make an emergency landing at London's Heathrow Airport. On the other hand, if George was taken off all medication, he would be unable to move at all. He would be unable to go to the bathroom and to eat and drink during a fifteen-hour journey.

Håkan Widner had traveled with George several times to Vancouver for PET scans and had learned how to control George's symptoms by giving him tiny amounts of L-dopa when he needed it. He planned to keep George off medication for the short trip to Los Angeles and then give him several small doses during the eleven-hour trip to Europe. This would not eliminate the risk of hallucinations, but it at least reduced them.

Langston said goodbye and wished them both luck. If all went well, he would join them in Lund in about a week's time. As he watched them walk out into the parking lot of the California Parkinson's Foundation, Langston thought that Widner and Carillo made a strange pair of traveling companions—the stocky, blond, blue-eyed Swedish doctor and the short, skinny, dark Hispanic patient. George even walked with a Chaplinesque shuffle.

The journey was a long and complicated one. Lund is in the southern part of Sweden, nearer to Copenhagen than to Stockholm. So first they would fly to Los Angeles. Then from LAX they would make a long polar flight to Copenhagen International Airport in Denmark. There a Hovercraft would take them the short journey to Malmö in Sweden, which was only a short car ride from Lund.

Copenhagen, Denmark, August 14, 1989

Widner watched George eat his breakfast. The L-dopa was wearing off and George had some difficulty lifting the spoon to his lips, but he had passed the night without a major hallucination. In fact, everything had gone remarkably well. George had consumed a double order of steak for dinner and watched the movie. He seemed to be taking full advantage of SAS's in-flight service.

In thirty minutes they would be landing at Copenhagen airport, where there would be a vehicle to take them to a Hovercraft. The Hovercraft trip would take about forty-five minutes. After clearing customs, there would be the friendly faces of Olle Lindvall and Patrik Brundin waiting to greet them and take them to the hospital.

Lund, Sweden, August 21, 1989

During the first week in the hospital, George was given a complete medical workup and a full battery of tests. When he wasn't being scanned or having blood drawn, he had been entertained by the two youngest members of the team, Drs. Håkan Widner and Patrik Brundin. They had rented him dozens of violent videos (at his request)—*Scarface* was his favorite—and brought him hamburgers to make him feel at home. They had even taken him out in a wheelchair to see the Malmö festival—a Swedish cultural event. George particularly liked a street band playing jazz and rock on homemade instruments. He had bought a tape of the band, and played it often on a borrowed tape recorder.

Still, George felt lonely and a little scared. The first operation was scheduled to take place tomorrow, and he wasn't quite sure what was involved. He had heard that Dr. Langston had arrived in Lund and would be over to see him shortly.

Langston was in the small library of the Lund neurology department meeting with the transplant team. Olle Lindvall was on his feet talking. On the board, he had drawn a cuta-

way picture of the brain and was explaining how the neurosurgeon would perform the transplants into George's brain.

"The neurosurgeon, Stig Rehnrcrona, is going to try to do the entire operation through a single small burr hole. Imagine the hole as a fulcrum. By rotating the injection cannula between insertions, he can reach a target in the caudate nucleus and the putamen. We hope this will work. If it doesn't he will have to make two burr holes."

"How long will the procedure take?" asked Langston.

Lindvall laid out the schedule. George would be put under general anesthesia at 8:00 A.M. Next, the stereotactic frame would be bolted to George's skull. Then George would be taken to radiology, where they would carry out a CAT scan and do the calculations that Stig Rehnrcrona needed for his operation. The implantations would begin around 1:00 P.M. As they were hoping to implant at least four sites, this should take about three hours.

Several changes had been made to the procedure since the first two fetal transplants were done in 1987. The cannula they now used was much smaller—1 millimeter instead of 2.5 millimeters in diameter. A series of fetal grafts in rats had produced much better cell survival using the smaller cannula. They hoped to increase cell survival by reducing to a minimum the delay between the procurement of the tissue and its implantation. They would be using only fetal tissue harvested from abortions on that day.

Another big difference was that they planned to implant fetal tissue into both sides of George's brain, making George the first patient in history to receive a bilateral brain graft. Today's operation would implant fetal tissue into the right side of George's brain. Another operation, in a week to ten days, would repeat the procedure for the left side. This would violate a golden rule of neurosurgery, which dictated that it was dangerous to operate on both sides of the brain within a short time. It would also greatly increase the cost and logistical complexity of the procedure. But the team had decided it was essential to give George a chance of a normal life. George's parkinsonism was so bad

on both sides that if a unilateral graft worked, George might be turned into a freak, able to move on one side and frozen on the other.

"What's the likelihood of getting enough fetal tissue?" asked Langston.

"That's the big unknown," Patrik Brundin chipped in. "We can't guarantee there will be enough suitable tissue. We hope it will be okay, but there is no guarantee that we will get enough. Our calculations show we need material from at least three fetuses; otherwise, the yield will be too low to make any difference."

"What happens if you don't get enough?" Langston asked anxiously.

"Then we don't do the operation. George will be sent back to his bed and next week we try again."

Surgical Unit, Lund Hospital, August 22, 8:00 A.M.

George Carillo slept through the most important day of his life. While he slept under anesthesia, the team began assembling the stereotactic frame. The operations on George's and Juanita's brains would not be open procedures like those carried out in Mexico City, but *closed* procedures, performed blind through a hole in the skull. Being less invasive, with less trauma and less risk of infection, closed operations are safer in principle. But closed procedures depend totally on stereotaxis. Without the stereotactic frame the surgeon has no way of orienting himself in three-dimensional space.

After bolting the stereotactic frame to George's skull, nurses wheeled him to radiology for a CAT scan. After his head was positioned precisely, the million-dollar machinery began to work, taking hundreds of X-ray pictures of his head which the computer integrated together to provide a three-dimensional picture of George's brain. Behind a large window, neurosurgeon Stig Rehnrcrona looked at a high-resolution screen on which the radiologist could conjure up a picture of any slice of George's brain viewed

from any angle. Rehnrcrona would not be able to use the CAT scan to navigate during the operation; he would be dependent on the stereotactic frame. All of the measurements and calculations that he was about to do had to be made with reference to the stereotactic frame.

The radiologist concentrated on the image of the steel bolts of the stereotactic frame. Carefully, she moved a cursor over the image of each of the bolts in turn and clicked on her mouse, entering the coordinates into the computer. She did this in the *x* axis, the *y* axis, and the *z* axis. These coordinates were the reference points for all the calculations that would follow. Any measurements that would be made, such as the angle of attack or the depth of implantation, would be made relative to these points.

Now Stig Rehnrcrona began to talk, asking for one view, then another. He wanted to plan a route into George's striatum that would be direct but avoid major blood vessels. His targets were the caudate nucleus and putamen. The most direct path to those targets was from from the back of George's skull. After experimenting with different angles, Rehnrcrona decided on a path. He carefully wrote down the parameters of the operation: the entry point into George's brain, the angles at which the cannula would be inserted, and the depth of that insertion, so that he would arrive at his targets in the putamen and caudate nucleus.

Tissue Culture Lab, Obstetrics and Gynecology Building,

9:10 A.M.

Patrik Brundin had just received the first aborted fetus of the day. After carefully sterilizing all of his instruments, he placed the tissue under the microscope. Like most abortions in Sweden, this one had been done using the suction method, which, while quick and relatively painless for women, fragments the fetus. Under the microscope, Brundin saw a jumble of white, translucent pieces of the fetal cadaver. His task today would be to try and reassemble the fetus, like a jigsaw puzzle, so that he could identify the area

that contained the substantia nigra. Then he would take that part and remove all the tissue which was fated to become bone, skin, and cartilage. It required enormous skill—the entire fetus is only the size of a fingernail and the substantia nigra the size of a pinhead. But Brundin had done this thousands of times with rat embryos, which look very similar.

The first fetus looked good. The suction hadn't damaged the fetus too much and Brundin knew he would have little difficulty finding the correct part and dissecting out the substantia nigra cells; it would take him about fifteen minutes. He stored the fetus in a carefully balanced solution and waited. He would need at least three and preferably four dissectable fetuses to make the operation worthwhile.

While Brundin waited for more fetal tissue, Olle Lindvall was pacing out one more time the route from Brundin's lab on the third floor of the obstetrics and gynecology building to the operating room on the seventh floor of the main hospital building. It involved a long walk and an elevator ride. Like most teaching hospitals, Lund was a very busy place, with patients and doctors moving about at all times. Lindvall had nightmares that the person carrying the tissue might get lost or be bumped in the elevator, causing him to drop the precious cells. Lindvall had decided that when Patrik Brundin carried the tray, he would be surrounded by foot soldiers—Anders Björklund, Bill Langston, and himself—to prevent his being joggled. Moreover, Brundin would wear a sterile surgical gown, mask, and gloves to impress bystanders to keep out of the way.

By 10:00 A.M. the radiology was finished and George was wheeled into the OR, where the anesthesiologists continued to monitor his vital signs. The nurses checked that everything was ready for the operation, and Stig Rehnrcrona began adjusting the stereotactic frame.

The second fetus that Brundin received had been good, and he had been able to locate the substantia nigra. But the third and fourth had been far too damaged. The fifth had been promising, but much too small. There was one more

fetus expected soon. If this was inadequate, then the operation would have to be postponed. Material from three fetuses was the bare minimum needed to get any effect.

By 11:45, when the sixth fetus arrived, Brundin was beginning to get worried. He began his examination. Proceeding cautiously, he reassembled the pieces into the recognizable form of a fetus. Yes, this looked promising. As he worked, his confidence grew. Yes, it looked like they might be all right.

Brundin took a new set of sterilized instruments and began the dissection of the first fetus. He located the substantia nigra region and began dissecting out all the tissue which was fated to become bone, skin, and cartilage. Each fetus took between fifteen and thirty minutes.

After finishing each dissection, Brundin immersed the tissue fragments in a 0.1 percent solution of trypsin to break down the connective tissue holding the structures together so the cells could later be dissociated into a suspension. The optimal time for this immersion was twenty minutes. Any more and the trypsin might damage the fetal cells.

By 2:30 Brundin had finished dissecting his third fetus. He removed the last mass of dissected fetal tissue from the trypsin, washed it, and placed it in one of several glass phials containing saline solution. He then inserted the phials in a metal capsule, which in turn was placed in a metal box that he wrapped in a surgical cloth. Brundin picked up the box gingerly and, surrounded by his escorts Olle Lindvall, Anders Björklund, and Bill Langston, set off for the operating room. Fully dressed in surgical garb, Brundin looked like a high priest involved in some bizarre ritual. And indeed, there was something reverential about what they were doing. What he carried in his hands was immensely precious. If today's operation worked, the cells would become part of George's brain and still do what they were designed to do—make dopamine.

The procession made the journey without incident and handed the tissue to the OR nurse, who in turn handed it to Håkan Widner, who anxiously waited in the OR. Widner's

job today was to time critical steps in the transplant and to assist with the preparation of the tissue. Patrik Brundin went into the changing room and changed quickly into a new set of surgical clothes.

Back in the OR, Stig Rehnrcrona picked up the electric drill and began making a tiny burr hole in the top of George's skull. This was the entry point to George's brain—with luck, the only hole Rehnrcrona would have to make in his skull that day.

Through an observation window, Langston, Lindvall, and Björklund sat anxiously watching the unfolding drama. Stig Rehnrcrona checked the settings on the stereotactic frame. Håkan Widner picked up a stopwatch and checked that it was working correctly. The OR nurses checked their instrument tables.

Patrik Brundin was now in the operating room, sitting at a table a few feet to Widner's right. Each fetus he had dissected contained roughly a million dopaminergic cells. He now had to prepare them for Stig Rehnrcrona. Large, solid pieces of tissue are impractical for a fine stereotactic cannula, so they had to be dissociated into smaller pieces—but not too small. Their animal research had shown that a single-cell suspension produced a very poor overall survival rate.

Brundin began carefully drawing up the mixture of clumps of fetal tissue and saline solution into a syringe. Deliberately, he began pushing and pulling the plunger of the syringe, using the mechanical energy to dissociate the cells into clumps of one hundred cells or so, the optimum size for today's procedure.

At 2:49 P.M., having set the stereotactic frame to the correct angles, Rehnrcrona carefully introduced the cannula—a rigid hollow wire—through the small hole in George's skull. Knowing not only the bearing but the depth of his targets, he planned to make three implantations in George's putamen and one in George's caudate nucleus. The PET scan had revealed that fluorodopa uptake in these areas was markedly reduced.

Like most neurosurgeons, Stig Rehnrcrona had incredibly steady hands. He held the guide cannula perfectly still as he began gently guiding it to its target. The cannula slipped gracefully between the folds of delicate nerve tissue. There are enormous risks to this procedure if it is not done correctly. One false move and George's brain could be damaged for life.

The 1.5-millimeter guide cannula, which Rehnrcrona had designed himself, was actually a hollow tube with a wire stylet placed inside it filling the tube so that it did not get clogged with brain tissue as it was pushed in. Once the tip of the cannula had reached the putamen, however, Rehnrcrona withdrew the stylet through the middle of the instrument. Then he introduced a second, finer, cannula, 1 millimeter in diameter, through the guide cannula and pushed on into the putamen itself. Now a direct channel existed through which fetal cells could be transferred to George's brain.

Taking the syringe of fetal cells that Patrik Brundin had prepared, Stig Rehnrcrona carefully and slowly injected it into the second cannula. To ensure that the tissue was well distributed, they had agreed to deposit the fetal suspension in eight portions, 2.5 microliters of fetal-cell suspension at a time, which they would attempt to spread out in the putamen and caudate.

As Stig Rehnrcrona squeezed the first 2.5 microliters through the cannula, Håkan Widner started his stopwatch. It was Widner's job today to pace Rehnrcrona. The speed with which the cells were deposited into the brain was critical, for a number of reasons. First, they did not want to damage the cells by injecting them too rapidly, so each deposit was spread out over twenty seconds. Second, they had to allow the cells to settle into the right site, and not be sucked out after being deposited when the instrument was withdrawn. Through their careful animal work, the Lund team had learned that it was necessary to leave the instrument in place for about ninety seconds before starting to withdraw it. During this time, the fluid in the suspension was ab-

sorbed into the surrounding brain tissue and the fetal cells settled into their target location.

After a ninety-second wait, Stig Rehnrcrona withdrew the cannula just 1.5 millimeters and, still in the putamen, repeated the process, injecting the second 2.5 microliters of fetal-cell suspension. In this manner, working slowly and deliberately, the fetal material for this first implant into the putamen was deposited in eight closely related sites in the putamen. By 3:15, the first implant was finished.

Now Stig Rehnrcrona adjusted the stereotactic instrument to a new set of coordinates and repeated the procedure using the same cannula, making a second implant in the putamen. Each implant deposited eight packets of 2.5 microliters of cell suspension to a target region. At 5:15, he finished the final implant. Everything had gone as planned. Rehnrcrona had made three implants into the putamen and one into the caudate. A total of 80 microliters of fetal-tissue suspension had been transplanted into George's brain.

Now that the valuable cells had been transplanted, the team had to ensure that George's body would not kill them off. George had been started on cyclosporine, an immunosuppressant drug, a few days before surgery, to guard against possible rejection. Now, to ward off infection, George was given antibiotics.

Anders Björklund had set up a microscope just outside the OR to do a final check. He wanted to do a last-minute examination of the fetal tissue to estimate what proportion of the cells were still alive. The processes of abortion, dissection, transport, and dissociation had all killed off cells. Björklund mixed 1 microliter of the cell solution with two fluorescent dyes, acridine orange and ethidium bromide. Dead cells cannot shut out the red ethidium bromide that sticks to DNA in the cell nucleus, whereas living cells accumulate the yellow acridine orange dye. What this means is that under the microscope, dead or dying cells light up as red spots and living, healthy ones shine a fluorescent green. Björklund counted the relative numbers of some five hun-

dred cells and found that roughly 70 percent of them were green and therefore alive. This was good news. It meant that possibly 70 percent of the implanted cells were still alive as well.

Björklund realized that many more cells would die inside George's brain over the next few days, especially if they didn't get the appropriate nourishment from the surrounding environment. If their careful animal research was any guide, in a week George would be left with perhaps 10 to 20 percent of the cells Patrik Brundin had started with. But with material from three fetuses, that ought to still be enough to produce a clinical effect.

By 7:00 p.m., George was wide awake, with Stig Rehn-crona, Ole Lindvall, Håkan Widner, and Bill Langston by his bedside. A full postoperative checkup revealed that George had no major problems, apart from vivid hallucinations—which many Parkinson's patients experience following general anesthesia. George did not appear to have any neurological complications from surgery.

The day after surgery Langston spent some time with his most famous patient before returning to California. Langston and Lindvall examined George and chatted with him for a while. While George seemed as grumpy as ever, Langston felt cautiously optimistic. George seemed to have come through the first test unscathed.

*Fax from Dr. Håkan Widner to Dr. Bill Langston,
August 28, 1989*

Things have settled down a little here. As I think I told you on the telephone, we had a lot of trouble with the weekend and night staff caring for George. To put it bluntly, they are terrified of him and at one point last Sunday, they refused to care for him unless he was tranquilized.

The problem is that they have never encountered any-

one like George before and treat him as if he were a demented bum. I have explained until I am blue in the face about his parkinsonism and about how he lives in a slow motion world, but they don't seem to have understood. They don't understand how hard George is trying all the time to do things. So they treat him like an idiot and prod him and cajole him into doing things. As you know, George hates to be treated like this and gets very angry. Things came to a head last Sunday when George was lying quite still hallucinating and a night nurse leaned over him and touched him to get him to do something. George snapped back into consciousness and grabbed her. You know how strong George is. Well, anyway the night staff were absolutely terrified. When I got there they refused to care for him.

At one point, they wanted to give George neuroleptics to calm him down. I of course told them that this would kill someone with advanced parkinsonism like George. They asked about other drugs. So I said to them, 'If you were pregnant would you take drugs?' "Of course not,' they replied. "Well, George has just had a fetal-tissue transplant. The cells in his brain are fetal cells a few weeks old, as sensitive to drugs as a first trimester 'baby.' If we give George tranquilizers we risk hurting those cells." This argument got through and we began to discuss constructive ways of treating George with proper respect so that he would not explode with anger.

On Monday, the day staff came in and everything was fine again. Lene has no trouble handling George and fully understands his needs and problems, but unfortunately, Lene can't be there all the time.

Best Wishes,
Håkan

*Fax from Dr. Håkan Widner to Dr. Bill Langston,
September 16, 1989*

As I think you heard, George's second operation on August 29 was something of a disaster. Poor George was under general anesthetic with the stereotactic frame in place, but we were unable to procure sufficient fetal tissue. We had no option but to wake him up and send him back to his room. He was, as you can imagine, a little disappointed. Anyway, things went much better last week on September 5. We managed to get four viable fetuses and made four injections to the left side of George's brain, transplanting about 80 microliters of tissue suspension.

Patrik and I have been trying to keep his spirits up. He knows that it will be some time before there are any results, but I think he is a little disappointed that nothing seems to have changed. I will be flying back to California with George on September 19 and will see you then before I bring Juanita back to Lund with me. Her operations are scheduled for October 16 and November 2.

Best Wishes,
Håkan

*Fax from Dr. Håkan Widner to Dr. Bill Langston,
November 10, 1989*

Juanita's stay here in Lund has been uneventful and she has been a delightful patient. She has grown quite close to Lene and the pair have played cards every day and talked about their families and children. Juanita has also grown very fond of our soft cheese here in Sweden and wants to take some back with her.

The only big problem we have had with Juanita is her smoking. She smokes a lot and smoking is not allowed in the hospital rooms. Unfortunately, because she is on cyclosporine she is not allowed to leave her room to go out-

side for a smoke. So in the end we had to bend hospital policy and allow her to smoke in the room.

The smoking was almost certainly behind the attack of pneumonia she got following her first transplant operation. As you know it's very common for parkinsonian patients who are heavy smokers to contract pneumonia following general anesthesia. This is something we need to watch with her.

A bigger problem that I see is the difficulty of finding a vein. Juanita has no good veins for inserting a needle. In her first operation, it took the anesthesiologist over an hour to find a vein capable of holding a needle. This may be a big problem in taking blood samples to monitor her cyclosporine. It may be something the doctors and nurses at Rocky Boy have difficulty with.

Anyway, I'll be bringing her home tomorrow and will report further once I am in the U.S.

Best Wishes,
Håkan

*Discharge Summary from Department of Neurology,
Lund University Hospital, Lund, Sweden,
November 11, 1989*

Patient: Juanita Lopez

Diagnosis: Secondary parkinsonism 332 D, due to MPTP-toxicity 968A.

Treatment: Stereotactic implantation of mesencephalic neurons to the left and right putamen and the left caudate nucleus 0234 which took place on October 16 and October 31.

Course: The surgical procedures were totally uncomplicated and the postoperative course totally uneventful. Prescription: The patient is transferred back to the U.S. for further evaluation by Drs. J. William Langston and James Tetrud, California Parkinson's Foundation, and by Dr. Håkan Widner on an intermittent basis. The result of

the operation is very gradual and slow, and the patient will be under evaluation for about a year. There will be several "one-dose" tests approximately every 2nd month and if possible timed test measurements. A PET scan will be made in Vancouver, Canada, after 4-6 months. Electro-physiological tests will be made in California after 4-6 weeks.

Medication: IT IS IMPERATIVE THAT HER ANTIPARKINSONIAN MEDICATION REMAINS UNCHANGED. ANY TAMPERING WITH SINEMET WILL INTERFERE WITH THE INTERPRETATION OF THE OPERATION. CONTACT DR. WIDNER OR DR. TETRUD BEFORE ANY CHANGES ARE MADE.

THE IMPLANTED FETAL TISSUE IS UNDER ACTIVE DEVELOPMENT FOR AT LEAST A YEAR FROM SURGERY AND SHOULD BE REGARDED AS SENSITIVE TO DRUGS AS A PREGNANT PERSON. USE THE SAME CAUTION WHEN PRESCRIBING DRUGS AS TO PREGNANT WOMEN.

NOTE! ALL DRUGS AFFECTING DOPAMINE TRANSMISSION (NEUROLEPTIC, DA ANTAGONISTIC DRUGS ETC.) ARE NOT TO BE USED.

▣ 20 ▣

OUT ON A LIMB

*Office of Director, National Institutes of Health,
Bethesda, Maryland, November 1989*

The newly appointed director of the NIH, Bernadine Healey, held the letter from Louis Sullivan, secretary of health and human services, in her hands. After sitting on the NIH report for nine months, Sullivan was at last officially making a ruling on Ed Oldfield's request to carry out fetal-tissue transplants in humans.

The temporary moratorium had been in place for twenty months. A blue-ribbon panel had considered the issues and advised the NIH advisory committee, on which Healey had been a member. They in turn had advised the new Bush administration. It had been a very thorough inquiry and it had come up with conclusions almost identical to similar bodies in European countries. They had recommended that research be allowed to go ahead under strict ethical guidelines. Now, after months of dithering, Sullivan had announced the administration's final decision on the matter: "After carefully reviewing all the materials, I am persuaded that one must accept the likelihood that permitting