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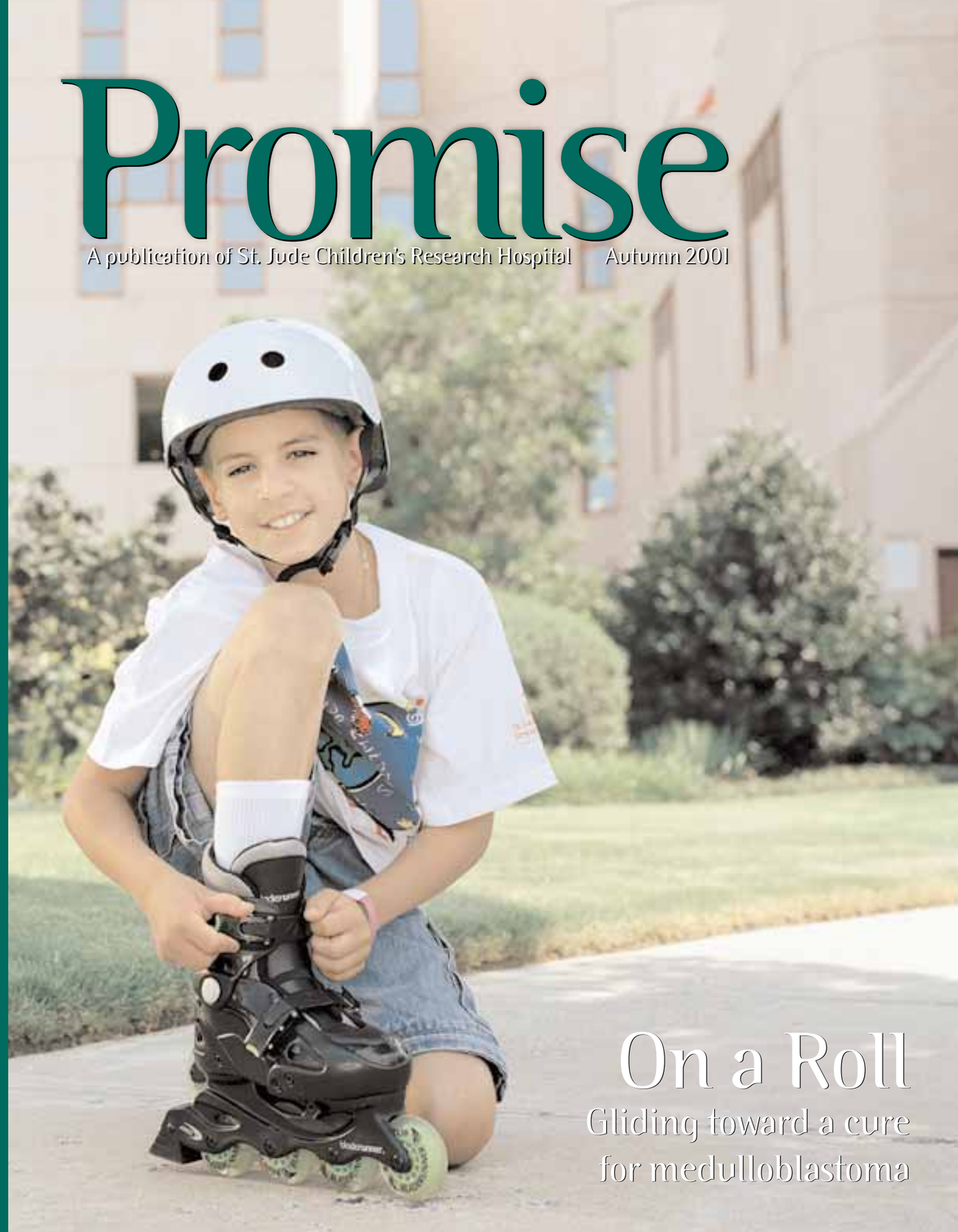
# Promise

A publication of St. Jude Children's Research Hospital  Autumn 2001



## On a Roll

### Gliding toward a cure for medulloblastoma

**St. Jude Children's Research Hospital** was founded by the late entertainer Danny Thomas. It opened February 4, 1962. The hospital was created because of a promise Danny made during the depression era to St. Jude Thaddeus, the patron saint of the hopeless.

"Show me my way in life," Danny prayed. In return, Danny promised to build St. Jude Thaddeus a shrine. That shrine became a hospital that would treat children regardless of race, color, creed or their ability to pay. This remarkable event also inspired the name of this magazine,

**Promise.**

*St. Jude Children's Research Hospital, Memphis, Tennessee*


# Promise

*Promise* is a quarterly publication of the **Department of Public Relations**
**St. Jude Children's Research Hospital**
**332 N. Lauderdale**
**Memphis, Tennessee 38105**

St. Jude Children's Research Hospital's mission is to find cures for children with catastrophic diseases through research and treatment.

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# Promise


A publication of St. Jude Children's Research Hospital Autumn 2001


## Features






## Highlights



## Perspective

# Highlights

## Today, Diagnosis...Tomorrow, a Cure

The discovery of the abnormal fusion of two gene segments will help clinicians readily diagnose a rare form of childhood cancer and may help lead to a cure.

The report, published in the July issue of *Nature Genetics*, identifies *RBM15-MKL1,* a gene abnormally fused from segments of two previously unidentified genes. Stephan Morris, MD, and Zhigui Ma, MD, PhD, of Pathology at St. Jude Children's Research Hospital led the study. The work was done in collaboration with Johann Hitzler, MD, a former postdoctoral fellow in Experimental Oncology at St. Jude, who is now at Toronto's Hospital for Sick Children.

EVANNE NEWMAN

*Stephan Morris and Zhigui Ma*

The genetic abnormality is likely a factor leading to the onset of acute megakaryoblastic leukemia, a rare form of acute myeloid leukemia (AML).

Clinicians can use the new findings to easily diagnose megakaryoblastic leukemia. This discovery could lead to the development of more effective, less toxic therapies for a cancer that is virtually untreatable. Only about one-quarter of the children with this type of AML respond to available treatments.

In children, megakaryoblastic leukemia most frequently strikes infants and toddlers up to age 4. About 20 percent of all childhood leukemias are of the AML type, of which roughly one-tenth are megakaryoblastic leukemias.

The scientists found that specific parts of two normal genes break off and then come together to form the new, abnormal fusion gene, *RBM15-MKL1*, found uniquely in the acute megakaryoblastic leukemias. The normal genes, named by the scientists RNA-binding motif protein-15 *(RBM15)* and megakaryoblastic leukemia-1 *(MKL1),* are located respectively on chromosome numbers 1 and 22.

## Tune in for Discovery Health

Four television programs featuring St. Jude are scheduled to air in late October on the Discovery Health Channel. The "Inside St. Jude" series is part of Discovery Health's "Lifeline" anthology, which provides a glimpse behind the scenes at some of the world's leading medical institutions.

Each program in the St. Jude series follows the treatment of several children with a particular disease, focusing on the research behind the treatment, as well as the personal drama inherent in each story. The programs are titled "A Glimmer in the Eye," about retinoblastoma; "Brave Volunteers," about neuroblastoma; "Little Miracles," about brain tumors; and "Lessons Learned" about leukemia.

The first three episodes are slated to air Sunday, October 21, with the fourth show airing Tuesday, October 23. Discovery Health will repeat these shows during the week and many times at later dates.

"St. Jude is truly a remarkable place, and I hope we've been able to capture that spirit of hope in this series," says Daniel Flaherty, producer of the series.

Air dates for the programs are subject to change, so check your local television guide to verify the schedule.




# In Defense of Children

## CIDC supporters Tom and Ginny Frattinger

BY JOE HANNA

SETH DIXON

*Ginny Frattinger, Elaine Tuomanen, MD, and Tom Frattinger tour the Children's Infection Defense Center (CIDC). More than 12 million children die each year from four infectious diseases: pneumonia, tuberculosis, cholera and acquired immune deficiency syndrome (AIDS). The Frattingers are avid supporters of the CIDC, which attempts to eradicate these and other infectious diseases by understanding human immunity and how viruses and bacteria cause disease.*

Sometimes epiphanies occur in the most unlikely places. It was outside a bathroom at St. Jude Children's Research Hospital that Ginny Frattinger gained personal insight into the hospital's mission. In that corridor, Ginny met one of the hospital's patients, seated in a wagon—the preferred mode of transportation for patients.

"It was when we first got here," Ginny says. "She was sitting in the wagon with a mask on her face, waiting for her mother. She was telling me that she was 3, and she had her little toys." The wagons struck Ginny as an extra touch that St. Jude provides for patients craving normalcy as they weather the storm of catastrophic disease. "I love the little wagons," Ginny says. "It is so much better (than wheelchairs)."

The interchange between visitor and patient occurred when Ginny and her husband, Tom Frattinger, made their first trip to see St. Jude. Tom had become acquainted with the hospital when a friend invited him to play in a 1992 golf tournament. He ended up serving on one of the event's committees. When Ginny accompanied Tom to a dinner and silent auction following the tournament, she learned that the hospital never turns a child away because of a parent's inability to pay.

"The true thing that hooked me was when a doctor said [that] he didn't know what he would have done if he had worked in a hospital where he had to turn a child away because of the lack of finances," Ginny says. "Being a parent, I had a lot of sympathy for that."

The couple recently made a generous donation to the Children's Infection Defense Center (CIDC), one of the St. Jude expansion areas. The center is attempting to eliminate catastrophic infectious killers of children by unlocking the mysteries of human immunity and by studying how viruses and bacteria cause disease. CIDC researchers are developing new vaccines and other agents to prevent, diagnose and treat infections and reconstitute crippled immune systems. More than 12 million children die each year because of pediatric AIDS, cholera, pneumonia and tuberculosis. At St. Jude, researchers and clinicians are waging active war against all of these killers. "This is something that eventually all of the world is going to be involved in," Ginny predicts.

Ginny says she believes the search for medical advancements should not be a competition, as it is in many other institutions. At St. Jude, clinicians and researchers work in tandem to discover cures for diseases and to bring those discoveries to the patients. Ginny says St. Jude serves as a model for how researchers should work together. "This is what medicine, I thought, is supposed to be," she says.

With the support of people like the Frattingers, the tiny girl in the wagon—and thousands of other children around the world—will continue finding hope and health at St. Jude.

# Touchdown, St. Jude

## With the help of his St. Jude team, Harris Jones scores once more.


SETH DIXON

BY ELIZABETH JANE WALKER

Throughout his high school football career, quarterback Harris Jones competed in dozens of intense games, demanding determination, ferocity and discipline. But on September 2, 1998, he began the most challenging contest of his life—a game of life and death.

One of the country's top high school athletes, Harris was accustomed to competition, challenge and accolades. As a high school senior, the quarterback had passed for more than 1,500 yards and 13 touchdowns. He had proven himself in the classroom, graduating with top academic honors. And he had garnered the respect of his peers, who elected him class president for four years and voted him Mr. Milan High School. As runner-up for the national Wendy's High School Heisman, Harris had appeared on the *Today Show*, been interviewed on ESPN and traded quips with college Heisman finalists in New York.

Now, the tenacious quarterback faced a foe more ominous than the most musclebound lineman. At 18, in superb physical condition, Harris Jones had acute myeloid leukemia.

### The kickoff

A standout in both baseball and football, Harris had experienced extreme fatigue during the spring 1998 baseball season.


SETH DIXON

Doctors prescribed rest for what they believed to be mononucleosis. When Harris reported to Murray State University's football camp a few months later, his energy level and weight began to plummet, and bruises appeared with alarming frequency. "Harris had just completed a stellar career at Milan (Tennessee) High School, and we were shocked and puzzled as to why he seemed to be struggling so hard physically," recalls Denver Johnson, former Murray State coach. "At first we dismissed it as freshman jitters, but as training camp went on, it became obvious that something was wrong."

Tests revealed that Harris' blood lacked sufficient numbers of platelets, the cells that cause the blood to clot. "Any little blow could have made me bleed to death," recalls Harris. His doctor immediately sent him to St. Jude Children's Research Hospital.

When he arrived at the hospital, Harris learned that he must undergo intensive chemotherapy. "I wanted to start treatment as soon as I could," Harris says. "I was completely focused on getting back on the field again." But no training regimen had prepared him for the game he was about to play.

For the next eight months, Harris would endure excruciating pain, nausea, diarrhea, rashes, headaches and life-threatening infections. "When Harris started treatment, they listed the side effects that might occur," says his mother, Rebecca Jones. "He had every single side effect." The handsome, 218-pound quarterback metamorphosed into a bald, 138-pound invalid. "One week, I was out on the football field playing college ball and living my dream, throwing passes to receivers and calling plays," says Harris, "a few weeks later, my dad was pushing me in a wheelchair. And then the hair loss started. Most men worry about going bald at 40, and here I was going bald at 18."

As the days turned into weeks, the bedridden patient began to lose muscle tone. "Physical therapists would bring hand weights to his room, and he was so weak and tired that he couldn't even use them," recalls Erika Bernberg, RN, BSN.

### The cheerleaders

In spite of his suffering, Harris retained a positive attitude that amazed the nurses and doctors who took care of him. "Even at the worst times, he would look

around and say that he was blessed to be here," says nurse practitioner Martha May. "He didn't regret the things that were happening to him, because he felt like they were making him a stronger person." On days when he felt better, Harris focused his energy on helping others, says Bernberg. "He would go meet new patients and give them little pep talks, telling them to hang in there."

Harris forged a friendship with John Sandlund, MD, attending physician on the Inpatient unit. The two men shared a passion for football and a deep faith. "Harris was determined to get through the treatment and to beat the leukemia," says Sandlund. "I'd go see him to encourage him and to let him know that I was praying for him."

Staff members at St. Jude were not Harris' only fans. Friends from his hometown and his college rallied to support him. Harris received thousands of cards and hundreds of visitors. Cash-strapped college students pooled their resources to buy gas for road trips to Memphis. More than 200 people donated platelets at the St. Jude Blood Donor Center in his behalf. And Murray State University's football team wore his initials on their uniforms during each game.

Harris' coach, Denver Johnson, was particularly supportive because he, too, had a tie to St. Jude. His daughter, Kelsey, was receiving treatment for acute lymphoblastic leukemia at the hospital. "My firm belief is that there are no coincidences in life," says Harris. "There is no other coach in the country who could have understood better what I was going through." Realizing that Harris needed inspiration during the long, grueling treatment, the Murray State coaches brought his helmet and practice jersey to St. Jude, where they served as constant symbols of recovery. Every Saturday, Harris held the gear in his lap as he followed the Murray State scores from his hospital bed.

SETH DIXON

## The comeback

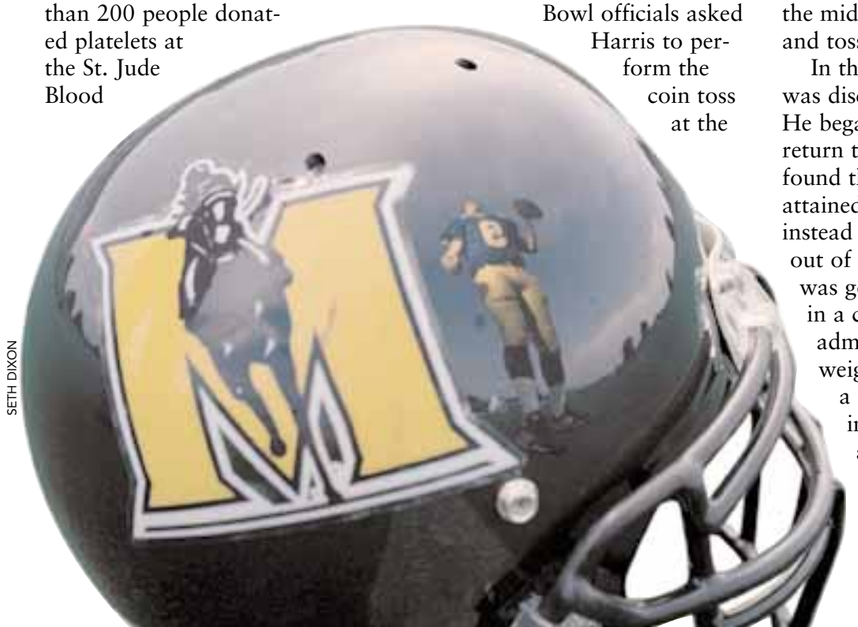
In December of 1998, Liberty Bowl officials asked Harris to perform the coin toss at the upcoming bowl game. Frail and weak, he had not walked for months. "I took my first step on Christmas Eve," says Harris. "If I took even two steps, I was out of breath. That morning, I woke up before my family did, and I practiced. I just wanted to be able to walk as a Christmas gift to my family." One week later, a pale, but determined figure stood in the midst of a packed stadium and tossed a coin into the air.

In the summer of 1999, Harris was discharged from the hospital. He began training that day to return to the gridiron. He soon found that the goal must be attained in increments of inches instead of yards. "When I came out of the hospital, I thought I was going to be strong again in a couple of months," he admits. But lifting hand weights in a hospital bed is a far cry from bench pressing hundreds of pounds and running full-tilt down the football field.

"The physics of this game are extraordinary, demanding great strength and aerobic conditioning," says Johnson. "When you knock your body down so far battling cancer, it's a Herculean task to get back. But I've never seen anybody display a better attitude toward adversity than Harris Jones. He met leukemia head-on, with great resolve, anchored in his faith. If anybody is able to return to the game, it will be Harris."

During his hospitalization, someone had asked Harris what he would like to do more than anything else. "One thing that always meant a lot to me was to run out onto the field with my high school football team and to hear the fans cheer," said Harris, the team's former captain. "It was such a rush. I always wanted to be the first one to burst through the banner." In the fall of 1999, Harris' wish was granted. Wearing his old high school jersey and pads and serving as honorary captain, he led the team once more. Just before Harris charged onto the field, he was astounded to see a group of people step forward, cheering and applauding proudly.

It was his doctor, pharmacist and nurses from St. Jude. They had traveled more than 100 miles to celebrate Harris' triumphant return to the field.



SETH DIXON

MARIANNE PAGE

SETH DIXON

*(Above) NFL star Peyton Manning visits with Harris Jones at St. Jude. "Peyton was my mentor and my idol and still is," says Harris. "After I got sick, he called me several times and came to see me. We still keep in touch."*

*(At left) Harris' life consists of much more than football. One of the top scholars in his high school class, Harris spent hundreds of hours volunteering in a local hospital and nursing home. Currently studying business administration, he plans to attend law school or enter the family business after graduation.*

## Touchdown

Today, the patient who once struggled to lift hand weights can bench press 325 pounds and is planning to play college baseball, as well as football. "I'm stronger now than I was before I got sick," says Harris, a dedicated business administration student on a full athletic scholarship.

Although he still works to regain his endurance, Harris' drive, determination and perspective are healthier than ever. "Three years ago, I couldn't imagine life without sports," he says. "Then I got sick. I approached the chemotherapy and leukemia as another game: like it was the fourth quarter and fourth and one on the goal line and we had to score. I did score, but the stakes were higher than the ones in a football game.

"I think God puts things in your life that make you grow," continues Harris. "Now, even if it's raining outside, the sun's still shining. I know what it's like to be in a wheelchair. It's a great feeling to wake up every morning and take a deep breath and walk and see the sun rise; to go outside and breathe the air without wearing a mask and to feel the wind against your skin. It's a feeling that people just take for granted, but I don't. I almost lost it all."•

# The FACE of HIV

BY MICHAEL CODY

*Like most St. Jude patients, Leo wakes each morning knowing he has a disease that he must beat. Leo follows a very strict medical regimen:*
*He takes a pill each morning at 11 and takes more pills each night at 11.*
*He has a support group that lends an ear.*
*Leo knows a team of medical professionals at St. Jude Children's Research Hospital who help him each day while they try to find a cure for his disease.*
*This young man is HIV positive. "Leo" is not his real name.*

PHOTOS BY SETH DIXON

## Rising to the challenge

According to the World Health Organization, more than 36 million people are infected with the human immunodeficiency virus (HIV), the retrovirus that causes acquired immune deficiency syndrome (AIDS). About 14,500 people become new victims of HIV daily.

Although most people associate St. Jude with its remarkable track record for fighting childhood leukemia, the institution focuses on numerous childhood catastrophic diseases. So when AIDS began claiming the lives of infants and children in the 1980s, St. Jude was there. In 1987, St. Jude founder Danny Thomas and HIV research pioneer Walter Hughes, MD, announced that the hospital would enroll children with AIDS. The institution quickly became a leader in the fight against the disease.

Today, investigators in the St. Jude AIDS program have designed a novel HIV vaccine and are studying the newest antiviral therapy drugs. The hospital's HIV/AIDS program is one of the most active pediatric clinical research centers in the nation. Researchers in Infectious Diseases and Immunology collaborate on human clinical trials for an HIV vaccine that is both formulated and manufactured at St. Jude (see page 10).

St. Jude is also the primary center caring for children and adolescents who are infected with HIV in the Memphis area. The local health department and hospitals refer their young patients with the virus to St. Jude, which has 12 active HIV protocols, 11 of which enroll toddlers and teens.

## Meeting the needs of teens

In the past, most children with HIV were infected through blood transfusions or mother-to-infant transmission. Today, most of the 50 HIV-infected patients at St. Jude are teen-agers who were infected through sexual transmission.

Leo is 18, and, unless a cure is found for HIV, he will likely spend the rest of his life taking medications at precise daily intervals.

*(Facing page) In the St. Jude AIDS Clinical Trials Unit, Katherine Knapp, MD, and other physicians treat teen mothers infected with HIV. Babies born to these moms also become patients.*

*(Top) Social workers Chris Sinnock and Sylvia Sutton work exclusively with patients enrolled in HIV protocols at St. Jude. They have worked collaboratively for more than a decade.*

*(Above) Patricia Flynn, MD, and pediatric nurse practitioner Sholar Clark Howard converse with an HIV-infected patient.*

With patients like Leo in mind, researchers at St. Jude approach HIV as a long-term commitment, helping the patients to maintain good health.

Like leukemia patients, young adults with HIV use several drugs to treat their conditions. A victim of sexual contact, Leo restrains his virus daily by taking the antiviral drug zidovudine (AZT) plus other medications used to interrupt viral replication. "This was a disease we anticipated would be somewhat similar in its management and therapy to leukemia," explains Patricia Flynn, MD, Infectious Diseases. "Even from an early time, we knew that we would need combinations of multiple drugs to suppress and, hopefully, cure the virus. Indeed, that's what has come to pass. However, we haven't reached the point where we can effectively cure the disease."

The immune system is delicate, and young HIV-infected patients are prone to opportunistic infections that prey on their weakened immune systems. But Leo and other patients can find hope in advances made at St. Jude.

"Probably what has really made a difference in the field of controlling opportunistic infections is the fact that the treatment of HIV has improved so much," says Flynn. "Patients now on combination therapy have a much slower progression of immune system deterioration. Because of that, they are not getting these opportunistic infections. Nor are they getting malignancies as frequently as we would have predicted, based on what we knew before we had these combination therapies."

As researchers produce better treatments for those infected with HIV, they are also scrutinizing the medications' long-term side effects. "When we first began HIV work, we said that it was a lot like leukemia," Flynn says. "We're now faced with some of the same issues." For example, protease inhibitors—a family of extremely

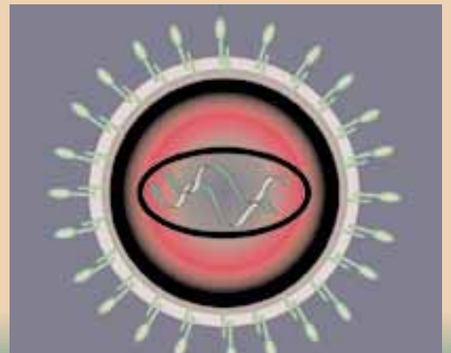
potent antiviral drugs—have been linked to the development of lipid metabolism disorders. Preliminary studies are showing that cardiac disease rates are five times higher than normal in adults who have used these medications for a number of years. "We're looking at starting young infants at about 2 months of age on these medications," Flynn explains. "We have a lot to learn about whether or not we are seeing the same sort of lipid profile abnormalities. Are these kids going to be having [heart attacks] at the age of 20?" Questions like these will drive St. Jude investigations during the next few years.

## Helping moms and babies

To decrease the virus' transmission from pregnant mothers to children, St. Jude began administering AZT as part of the national Pediatric AIDS Clinical Trials Unit in 1994. The success rate has been startling. Today, the transmission rate is below 5 percent, compared to a 25 percent rate before the use of AZT.

The hospital's early success in stemming transmission of the virus from pregnant mothers to their children has allowed St. Jude to add a new focus to the teen epidemic. Each year, five to 10 teen mothers are added to St. Jude protocols, which include medicines to keep their HIV infections in check and to help protect the health of their unborn children. Close collaboration with University of Tennessee clinical investigators in the department of Obstetrics and Gynecology allows seamless transitions of patient care. Pregnant teens with HIV are invited to join the St. Jude protocol designed for perinatal care. "If the mother is a teen, we can treat her for HIV, also," says Sholar Clark Howard, pediatric nurse practitioner, Infectious Diseases. "Our rule is 'treat the mother first.' If the mother is already on an HIV regimen and doing well, we continue. We don't do prenatal care, but we'll treat her HIV. Once the baby is born, we automatically accept the child as a St. Jude patient."

Researchers at St. Jude are constantly exploring new agents for treating HIV-infected pregnant women. Concerned about the long-term side effects of such exposure, investigators have spent the last eight years monitoring children who were exposed to AZT in the womb. Preliminary results indicate that these children are suffering no adverse effects from the exposure. But because many new medications are being used, St. Jude staff members are continuing to study this issue.



*The human immunodeficiency virus (HIV) is responsible for the world AIDS pandemic.*

## Stigma and secrecy

Treatment plans for HIV and leukemia share many similarities. Both require daily regimens of medical care, and both are treated with combinations of medications. But the two diseases are worlds apart in terms of social ramifications. If Leo were a leukemia patient, this article would contain glossy photos and detailed descriptions of a handsome teen-ager. But Leo does not want you to know what he looks like. After all, Leo has HIV.

Unlike a leukemia patient, Leo will not have parties at school to celebrate small triumphs in his medical journey. Aside from a tiny circle of people, no one knows Leo is HIV positive. In fact, if you were to meet Leo in the hospital and ask why he is here, he would most likely tell you he has "a blood disease."

Christine Sinnock is a social worker who works with HIV-infected patients at St. Jude. She knows firsthand of the public relations battle these young patients face. Sure, they would love the recognition that many children with leukemia receive. "The kids at St. Jude who are HIV positive want to raise awareness about their disease," says Sinnock. "But society has preconceptions about people infected with HIV." Awareness comes at a high price in a world where privacy can be stolen through the snap of a camera shutter, the click of a computer key, or the chatter of gossip.

Clinical professionals, including Sinnock, work in a world of secrecy to help these patients. The local health department reaches Sinnock by beeper when they have a new case of HIV involving a teen. She then goes to the teen and tries to convince the young person to obtain parental consent for treatment at St. Jude. Sinnock's practices are tightly regulated concerning patients' privacy.

Like the HIV virus itself, the fight against the disease is ever changing and multifaceted. In St. Jude laboratories and clinics, scores of people are trying to discover a cure and to increase the quality of life for HIV-infected infants, children, teens and moms. Other workers are striving to increase awareness of the disease while guarding patients' privacy. United in their quest to eradicate a global scourge, St. Jude employees also provide hope for 1.4 million children living with HIV today.

Let's call them Leo.•

# Defending against the invader

Like an enemy soldier trained in guerilla warfare, the human immunodeficiency virus (HIV) invades the body by disguising itself and ambushing unsuspecting cells. Within the next five years, St. Jude researchers hope to have successfully produced a vaccine capable of defending children against this virus, which has created the AIDS pandemic.

"Our goal would be to immunize young children at 5 years of age or less, before they are at the age of contracting the virus," says Julia Hurwitz, PhD, Immunology.

HIV can change disguises quickly, making it a slippery adversary. Knowing the surreptitious nature of the virus, researchers at St. Jude are taking a different approach to vaccine development than investigators at other institutions. The St. Jude vaccine will teach the immune system to attack the numerous protein shells, or "envelopes " that the virus uses to mask and protect itself. Developed by Hurwitz and Karen Slobod, MD, Infectious Diseases, the vaccine is a step ahead of most other vaccines in development, which only target one or two envelopes.

The St. Jude vaccine will consist of three shots, which target as many as 100 envelopes, or disguises, used by the virus. "We suggest that many of the other strategies are missing the target, because they are not addressing the diversity of the virus," Hurwitz says. "By representing the diversity of HIV in a vaccine, we argue that we can better arm the immune system to prevent infection. We therefore designed a vaccine cocktail incorporating multiple, distinct HIV envelope proteins."

Researchers have shown that the St. Jude vaccine, in development since 1993, can trigger the production of antibodies able to neutralize HIV in a culture dish. The three-shot vaccine will work by waking up the immune system and helping it identify the virus' many different disguises. "It's as if you have an army in your body ready to battle HIV, but all the soldiers are asleep," Hurwitz explains. "These three shots will awaken the soldiers. The vaccine will prepare your immune system for battle by showing your white blood cells what to look for."

Each injection will target different white blood cell subsets, arming several distinct immune system populations. "After vaccination, individuals will produce strong antibody and T-cell responses that should prevent infection if there is a later exposure to HIV," Hurwitz says.

Currently, one shot of the three-part vaccine has already been produced and is being tested in a clinical trial to confirm safety. Material for the other two parts of the vaccine is now in production for similar safety testing.

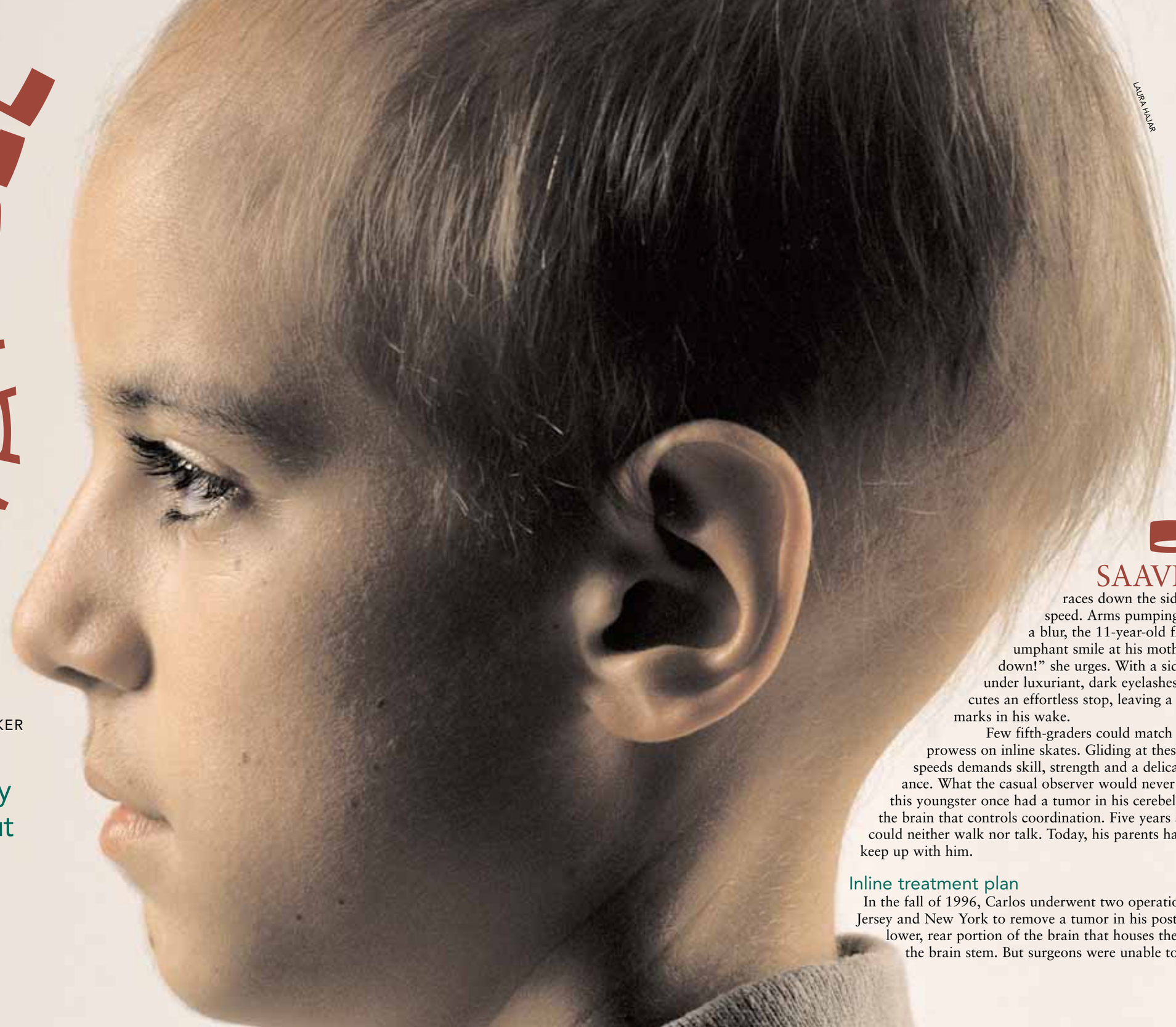
The vaccine will undergo many testing stages during the next few years. Once safety trials of all the components are complete, researchers will combine the three parts and move into trials designed to determine whether the vaccine can produce the immune response needed to prevent HIV infection.

Production and testing of a complicated biological material like the HIV vaccine takes many years to complete, but with steady progress, this team of St. Jude soldiers plans to win the war against a worldwide killer.

# ON A ROLL

By Elizabeth Jane Walker

## A multidisciplinary team works to put medulloblastoma patients on the road to recovery.



LAURA HAJAR

CARLOS SAAVEDRA races down the sidewalk at warp speed. Arms pumping, inline skates a blur, the 11-year-old flashes a triumphant smile at his mother. “Slow down!” she urges. With a sidelong glance under luxuriant, dark eyelashes, Carlos executes an effortless stop, leaving a trail of skid marks in his wake.

Few fifth-graders could match Carlos’ prowess on inline skates. Gliding at these blistering speeds demands skill, strength and a delicate sense of balance. What the casual observer would never guess is that this youngster once had a tumor in his cerebellum, the part of the brain that controls coordination. Five years ago, Carlos could neither walk nor talk. Today, his parents have to sprint to keep up with him.

### Inline treatment plan

In the fall of 1996, Carlos underwent two operations in New Jersey and New York to remove a tumor in his posterior fossa, the lower, rear portion of the brain that houses the cerebellum and the brain stem. But surgeons were unable to remove the

entire tumor, which was classified as medulloblastoma, the most common malignant brain tumor in childhood. “They only gave Carlos a 40 percent chance of living,” recalls his mother, Linda Tomasso-Saavedra. When she began to investigate treatment options, Linda turned to Carlos’ doctor for advice. “Okay, assume this is not Carlos; this is your son,” said Linda. “Where are you going to send him?” The physician replied, “The best hospital in the world is St. Jude Children’s Research Hospital…It has the most innovative protocols. That’s where I would send my son.”

When Carlos and his parents arrived at St. Jude, he was enrolled in SJMB96, a new protocol, or specific treatment plan, designed for patients between the ages of 3 and 21 who had medulloblastoma or supratentorial primitive neuroectodermal tumors. The study also involved children at institutions in Texas and Australia. Because part of Carlos’ tumor was still present, he was assigned to the high-risk group, which received the protocol’s most aggressive therapy. The treatment consisted of three main components. First, Carlos received two courses of therapy with a new drug called topotecan. Then he received a special kind of radiation therapy. Some of Carlos’ stem cells, key components of the immune system, had been harvested and stored; they were reinfused after each of four subsequent cycles of high-dose chemotherapy.

SJMB96 was unique in several ways. Topotecan had never been used on untreated children with medulloblastoma. Patients in the study also received a specialized kind of radiation designed to minimize damage to surrounding brain tissue. The chemotherapy delivery was novel. In traditional treatment plans, medulloblastoma patients undergo up to a year of low-dose chemotherapy. Patients in SJMB96 received a brief course of extremely intense chemotherapy in conjunction with stem cell replacement. “It was an unknown concept,” says the protocol’s principal investigator, Amar Gajjar, MD, of the St. Jude Hematology-Oncology department. “But we thought if we could use more aggressive therapy, then maybe we would have a better outcome.”

LAURA HAJAR

*Brain tumor survivor Carlos Saavedra demonstrates his skating expertise on the sidewalks at St. Jude.*

SETH DIXON

*The principal investigator for SJMB96, Amar Gajjar, MD, of Hematology-Oncology, pauses with St. Jude patient Wesley Burba, who participated in the medulloblastoma protocol.*

## Skating in sync

Long before Carlos knew he was sick, scores of people at St. Jude were working on techniques and therapies that would eventually be used in his treatment. A diverse group of physicians, scientists, nurses and support personnel had pooled their talents and skills to address the array of challenges inherent in such a project. “That’s the neat thing about the way this place works,” observes Clinton Stewart, PharmD, of Pharmaceutical Sciences. “The clinicians and the clinical scientists and the basic scientists all talk and work together to come up with better protocols for the kids. A huge crowd of folks are involved in putting something like this together.”

In 1992, Stewart and St. Jude pediatric oncologist Charles Pratt, MD, had conducted the world’s first pediatric clinical trial of topotecan, the drug that would be given to Carlos. In ensuing years, researchers learned that topotecan could kill medulloblastoma cells and that it could effectively penetrate the cerebrospinal fluid (CSF), the fluid that flows through the brain and spinal column. The challenge Stewart faced was adjusting Carlos’ dose of topotecan so that the drug would travel through the bloodstream to the CSF and remain there at an adequate level for eight hours. When Carlos began intravenous infusions of topotecan, technologists in Stewart’s laboratory repeatedly obtained blood samples, performed analyses to adjust the dose according to Carlos’ specific needs, and determined the drug’s CSF concentration. This kind of individualized dosing was used for each child who received topotecan. “From a pharmacokinetic standpoint, the clinical trial worked beautifully,” observes Stewart, who is also one of several St. Jude investigators studying a drug that may help patients who experience hearing loss from medulloblastoma treatment.

## Spokes on the wheel

After six weeks of topotecan, Carlos began radiation therapy. The protocol offered the first systematic introduction of 3-D conformal radiation to target a smaller area than had traditionally been treated for medulloblastoma. Radiation therapy for medulloblastoma has long included treatment of the whole brain and spine, with a boost dose of radiation to the entire posterior fossa. As radiation destroys the tumor cells, it can also damage nearby normal tissues, causing learning problems, hearing loss, and growth and development problems. Investigators found that they could apply radiation to a smaller area of the brain and still destroy the tumor. Carlos’ boost dose targeted the tumor bed instead of the entire region. Using conformal radiation therapy, radiologists could focus intense radiation on a specific location, killing Carlos’ cancer cells while reducing damage to healthy cells.

SETH DIXON

*Individualized dosing was used for each child who received topotecan as part of SJMB96. Here, a technologist in the laboratory of Clinton Stewart, PharmD, injects an extract of the patient’s plasma into a machine that tells how much topotecan is in the patient’s body.*

When radiation is applied to a child’s head and spine, almost 40 percent of the patient’s bone marrow is affected, reducing the bone marrow’s function for many months. Anticipating that side effect, clinicians had already collected and stored Carlos’ stem cells. During the final phase of treatment, he received four intensive courses of chemotherapy. To help his system fight infection, the healthy stem cells were reinfused after each course. In this manner, Carlos was able to tolerate a much higher dose of chemotherapy than is normally given. “By giving the stem cells back, the patients recover quickly without the long-term side effects of prolonged marrow suppression and increased chance of infection,” explains Gajjar.

Patients completing the protocol were offered the opportunity to participate in cognitive testing to evaluate any changes in intellectual functioning that had occurred as a result of treatment. Children who needed help in this area could receive intervention through behavioral modification training or methylphenidate drug therapy.

“The methylphenidate and behavioral modification projects are the first two studies of their kind in the world,” says Raymond Mulhern, PhD, chief of Behavioral Medicine. Carlos underwent psychological testing to determine the severity of his attention problems and then began taking methylphenidate. “It absolutely has helped him in his schoolwork,” says his mother. “He can focus better, attend to tasks longer, and he feels better about himself.”

Midpoint results of the SJMB96 protocol indicate that survival rates could increase dramatically for children like Carlos—as high as 80 percent for high-risk patients and 90 percent for standard risk patients. Current survival rates range from 55 to 65 percent for

high-risk patients and from 70 to 80 percent for standard-risk patients. “The early outcome results of this approach are very encouraging,” says Gajjar, who is currently designing another study based on results from the protocol.

Like SJMB96, the new protocol will involve staff from many different areas of the hospital. “We see a moderately large number of kids with medulloblastoma, and everybody basically relates like spokes on a wheel to the given protocol that’s in development,” says Larry Kun, MD, who heads the St. Jude Brain Tumor Program.

## What’s next?

One of the most exciting additions to the next medulloblastoma protocol will likely come from the laboratory of Richard Gilbertson, MD, PhD. A faculty member in Hematology-Oncology and Developmental Neurobiology, Gilbertson came to St. Jude last year after winning the Schweisguth Prize, a prestigious international research award. He is investigating the function of a group of cellular proteins called ErbB2 receptors. Involved in the development of

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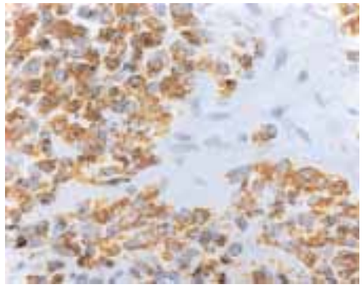
*Richard Gilbertson, MD, PhD, investigates ErbB2 receptors, a group of proteins that can make cells grow abnormally and form tumors.*



*In these cells from a medulloblastoma tumor, the cell nuclei are blue, and the ErbB2 receptors are brown. Children who have high levels of ErbB2 in their tumors do not fare as well as those who have low levels of the receptor. This marker may be used to determine which patients should receive more aggressive therapy for medulloblastoma.*

many brain tissues, ErbB2 receptors can also make cells grow abnormally and form tumors. “We have found that children who have high levels of the ErbB2 receptor in their tumors do a lot worse than children who don’t,” says Gilbertson. He and his colleagues are trying to understand how ErbB2 makes tumors grow faster or makes them less sensitive to treatment. They are also trying to identify drugs that affect the receptor in pediatric medulloblastoma.

In SJMB96, patients were assigned to standard-risk or high-risk categories by determining whether the cancer had spread or the entire tumor had been removed. But sometimes the tumors of “standard-risk” patients do not respond well to therapy. Why not? Gilbertson says the answer may lie in the ErbB2 receptor. He proposes looking at the tumor cells of newly diagnosed medulloblastoma patients and evaluating the amount of ErbB2 receptor that is present. Children who have excessive levels of ErbB2 will be assigned to “high-risk” categories, regardless of clinical findings, and will receive aggressive therapy. “Nobody has ever used a so-called biological marker to try and guide therapy in this disease,” says Gilbertson.

## Gliding toward a cure

Tom Curran, PhD, chair of Developmental Neurobiology, is involved in several other studies that may shed light on medulloblastoma. He and his colleagues study the fundamental biology of the brain, a structure that consists of billions of cells. “The brain,” Curran says, “is like the most complicated jigsaw puzzle you could ever imagine.” Curran has been studying a gene called *reelin* since he discovered it in 1995. *Reelin* controls the process that causes newly generated cells to move to their appropriate positions in the cerebellum. When *reelin* is mutated, cells in the cerebellum do not migrate properly, resulting in a defective brain structure. Mice and humans with *reelin* mutations cannot move around properly. This is the same brain structure in which medulloblastomas arise.

Another project in Curran’s department involves the *patched* gene, which is mutated in a rare form of medulloblastoma. Normally, *patched* serves as a braking mechanism to slow down cell growth. When one of these genes is lost, cells grow with abandon, forming tumors. By learning more about the *patched* gene, Curran’s team hopes to find new ways of stopping tumor growth. “If you can really understand the genes that cause tumors, then you will be able to make much better drugs,” says Curran. “But it takes a very long time to do that. This is, in part, a reason St. Jude is successful. We take on difficult problems and know it’s going to take a long time to solve them, but we build toward that because of the resources that are provided by ALSAC.”

Curran’s interest in medulloblastoma began six years ago when he arrived at St. Jude and spent a week in the clinic. “I met a medulloblastoma patient who had been cured, but he was still having trouble walking and learning,” says Curran. “I realized then that this was a tumor that I needed to work on. St. Jude is the best place to do that. Here, there is an integration of clinical science with basic research, and I have an opportunity to make an impact on these very difficult problems.

“When you work at St. Jude, you see every day the reason that you’re here—you see the patients in the corridors,” Curran concludes.

Linda Tomasso-Saavedra says the proximity of labs and clinics means that children like Carlos obtain the best possible care. “This hospital is really comprehensive,” she says. “With the most innovate protocols and the most sophisticated equipment, it’s the best in the industry. And there’s a lot of love here.”

“Besides,” she says, as her son whizzes by on skates, “where else can you go where you can actually sit down and talk with the doctor who wrote the protocol?”•

LAURA HAJAR

EVANNE NEWMAN

*Patient William Cooper demonstrates his coordination by touching his nose during an exam with Larry Kun, MD, head of the St. Jude Brain Tumor Program.*

## More Than Medulloblastoma

Many types of brain tumors exist. The St. Jude Brain Tumor Program has active protocols for most of them.

The Brain Tumor Program collaborates directly with the Developmental Neurobiology department, which researches brain development and function.

The extent to which the Brain Tumor Program is integrated with other hospital areas is unique. The clinical program is a partnership among the Radiation Oncology, Hematology-Oncology, Developmental Neurobiology, Pathology, Behavioral Medicine and Pharmaceutical Sciences departments and is supported by other services including the Hartwell Center for Bioinformatics and Biotechnology, Neurology, Nursing and Rehabilitation.

St. Jude was chosen by the National Cancer Institute (NCI) as one of nine centers to form a Pediatric Brain Tumor Consortium, which develops innovative therapies and makes them available to children with brain tumors. This new consortium allows our patients to get the most advanced therapy available for brain tumors.

St. Jude is the only pediatric research hospital that has been awarded an NCI cancer center support grant.

St. Jude is the only private cancer center in the United States committed to caring for and supporting children with cancer regardless of families’ financial or health care resources.

*Joey Marlin trains for the Marine Corps Marathon. His son, Luke, received treatment for a brain tumor at St. Jude. "During Luke's treatment, he had MRIs, radiation treatments, medications, physical therapy, psychological and physical exams, and more. But we have never received one bill from St Jude," says Joey. "We are very much indebted to St. Jude. In October, I plan to run for my son and for all the other children who benefit from the care at St Jude."*

# RUN FOR THEIR LIVES

## More than 400 runners are going the distance for St. Jude in this year's Marine Corps Marathon.

BY JOE HANNA

On a Sunday in October, David Scanlan will run.

He will run to show that he can do it again, having recovered from injuries when a car struck him during an evening jog last year. He will run for his son, who suffered from cancer back in 1986.

But most importantly, he will run for the children of St. Jude Children's Research Hospital. And he will not be alone.

On October 28, Scanlan will join 16,000 other athletes participating in the 26th annual Marine Corps Marathon, a 26.2-mile test of endurance and stamina through the streets of Washington, D.C. Scanlan and 400 other competitors from 28 states will run on a team that is raising money for St. Jude.

For Scanlan and several others, the run is

SETH DIXON

personal. Scanlan is not just a St. Jude supporter; he is a St. Jude parent. In 1986, his son was suffering from non-Hodgkin lymphoma and a fungal infection. At one point, doctors told Scanlan and his wife that their son might not make it through the weekend. The couple spent days in the St. Jude Intensive Care Unit while their child fought for his life.

Scanlan knew that St. Jude was his son's best hope. That is why he runs in the marathon today: to make sure that the work at St. Jude never stops.

In 1998, three women decided to enter the marathon to challenge themselves and to raise money for St. Jude. Those women were WMZQ radio personality Jessica Cash, station intern Cheryl Conner and Julie Butler, senior director in the DC-area regional office of the American Lebanese Syrian Associated Charities (ALSAC), St. Jude's fund-raising arm. The following year, St. Jude officially fielded a team of dedicated runners. Team members have raised more than $600,000 for the hospital through the marathons. Each runner must raise at least $1,000 to participate. Cash's radio station has topped the $1 million mark during its Country Cares radiothon for two years in a row, thanks in part to fund-raising events such as the Marine Corps Marathon.

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Hearing Cash talk about the marathon inspired Rick Runner to join. "I was driving to work listening to the radio," recalls Runner, a 19-year Army veteran. "I thought it would be a neat way to do the marathon. And it is hard not to adopt the St. Jude cause the more you hear about it."

When Runner walked into the tent during the first group meeting last year, he found that his arrival was highly anticipated. "They thought it was a joke," Runner said, referring to his last name. It didn't help that his home address contained the word "homestretch," as well.


*After running the Marine Corps Marathon to raise funds for St. Jude, David Scanlan Jr. is congratulated by his wife, Pam, and son, David III.*

Runner enjoyed the camaraderie at the event, and he was moved to discover that by running he could help a child. The 2000 squad raised about $250,000. During their post-race meeting, team members learned that the amount they had raised would pay for treatment for a child with acute lymphoblastic leukemia, the most common form of childhood cancer. "I was stunned," Runner says. "Just by running and raising a few dollars, we had saved a life."

But the Marine Corps Marathon is not really "just running." It is a grueling test of endurance that requires intensive preparation and commitment.

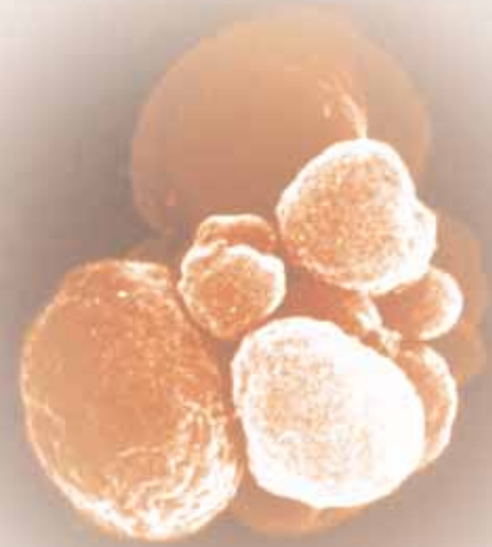
When the runners feel like they can't make the next leg of the marathon, they think of the children at St. Jude. That is what Scanlan does. He thinks of the children he met in 1986, and he thinks of the children today who are fighting for their lives. Suddenly, making the next corner isn't so difficult.

Scanlan has one other bit of motivation that keeps him running.

He knows that when he reaches the finish line, he will receive a big hug from 26-year-old David III—now a survivor of childhood cancer, thanks to St. Jude.•



Many St. Jude researchers study complex basic science questions that might seem futile at first glance, but the answers to such queries as "How do cells commit suicide?" could lead to greatly improved treatments and outcomes for patients suffering from cancer and other life-threatening diseases.



GOPAL MURTI

BY LOIS M. YOUNG

# An Orderly Demise

Have you ever thought about what happens to your skin when you get sunburned? Or more specifically what happens to the individual skin cells?

You might think they are burned and therefore die and peel off. Well, that is usually correct. Essentially, a sunburn is a way for your body to protect itself against skin cancer. The UV radiation from the sun causes chromosome abnormalities or mutations in the skin cells. Those cells recognize that they are damaged and activate their own death processes. In a sense, the cells commit suicide.

"But if you get a deep enough burn and some of the cells do not peel off, and they are left to receive another sunburn at a later date that can induce a second mutation. And soon you are dealing with melanoma (skin cancer)," says Vincent Kidd, PhD, a member of Tumor Cell Biology at St. Jude Children's Research Hospital.

St. Jude investigators have not focused much on skin cancer, but many *are* studying the very natural and necessary process of apoptosis, or programmed cell death.

"It's a normal process that's been going on for hundreds of millions of years," says John Cleveland, PhD, a member of the St. Jude Biochemistry department. "Organisms need a way to remove unwanted cells. It's a process that is required for normal development, and it is a process that goes amuck in a cancer cell, but it is something that we need to take advantage of to find better treatments."

In fact, cell death is such a necessary process that if it did not occur we would all have webbed feet and hands. In human embryos, skin connects the digits of the hands and feet. At about 11 weeks of development, these skin cells kill themselves, separating the digits into fingers and toes.

"This is a good example of how cell death is involved in pattern formation," Cleveland explains. "We all have our own shape and structure because certain cells die to create that kind of pattern. It's not just a process by which cells grow and stop growing. Cells also die to create these patterns.

"So finding the genes that are involved in this process is central because these are the kinds of genes that are also going to be misregulated or inactivated in cancer," he says.

Cleveland was one of the first researchers to study cell death processes at St. Jude about 12 years ago,

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*Vincent Kidd, PhD, and Jill Lahti, PhD, of Tumor Cell Biology discovered that the gene for the protein caspase 8 is frequently silenced in a certain form of neuroblastoma. The caspase 8 protein is a crucial player in many cell death processes.*

beginning with the *MYC* oncogene, a cancer-causing gene that is probably activated directly or indirectly in almost every tumor. Most researchers were not interested in apoptosis at that time, but during the past few years cell death has become a primary area of study at many research centers. More than two dozen principal investigators at St. Jude are actively pursuing the answers to questions surrounding cell suicide. And these researchers represent multiple departments including Tumor Cell Biology, Biochemistry, Genetics, Immunology, Infectious Diseases, Pharmaceutical Sciences, Genetics, Pathology, Hematology-Oncology, Molecular Pharmacology and Experimental Hematology.

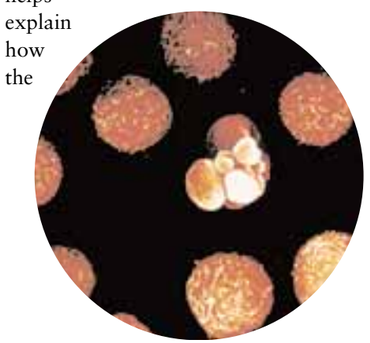
"The process is so broad that it affects many disciplines," Cleveland affirms. "Cancer cells die by this process and normal cells need to suppress this program to stay alive. It's a continuous process that is associated with many different medical conditions."

Jill Lahti, PhD, of Tumor Cell Biology explains, "Normally your body regulates itself by getting rid of abnormal cells through the cell death process, but when something else happens that gives certain cells a growth advantage, you get a tumor."

Cancer-fighting chemotherapy works by killing cells; it kills them by inducing the cell death process. That explains why chemotherapy has so many toxic side effects—it kills good cells along with the bad. "But if you can take cells that overexpress a gene, like *MYC*, then you'll be able to have some kind of selectivity in terms of therapy," Cleveland says.

While the cell death studies of Cleveland and other basic science researchers might not result in treatment improvements for several years, Kidd and Lahti's team reported a finding last year that is leading to a clinical trial.

They discovered that the gene for the protein caspase 8 is frequently silenced in a certain form of neuroblastoma. Neuroblastoma is a common tumor of the peripheral sympathetic nervous system that affects young children. The caspase 8 protein is a crucial player in many cell death processes. Silencing the *caspase 8* gene results in complete absence of the protein and helps explain how the tumor cells escape death, grow uncontrolled and become insensitive to chemotherapy drugs and radiation.



*Surrounded by healthy cells, a damaged cell (center) activates its own death.*

GOPAL MURTI

"It is important to determine how cell death processes become suppressed in cancer because repair of a cancer cell's defective cell death machinery offers the promise of effective and specific anticancer therapy," Kidd says.

Some neuroblastoma tumors have an increased number of copies of the *MYCN* oncogene, an important controller of cell proliferation and cell death. Children with these tumors have a particularly poor prognosis. The Kidd and Lahti team found that a large proportion of the neuroblastoma tumors with more than two copies of *MYCN* lack the caspase 8 protein. In these tumors the *caspase 8* gene was shut down by a chemical modification involving the addition of methyl groups to the gene. By reintroducing the *caspase 8* gene into deficient neuroblastoma cells the researchers restored the cells' ability to undergo cell death in response to the chemotherapy drug doxorubicin.

The team also found that the caspase 8 deficit can be corrected using demethylating agents. This corrective action will be tested in a clinical trial, using a demethylating compound—decitabine—that has been approved by the Food and Drug Administration. St. Jude researchers are collaborating on this project with a group from the Dana-Farber Cancer Institute and Harvard School of Medicine in Boston.

"The Harvard investigators will treat the patients with decitabine for a few days; then those patients will receive a round of chemotherapy," Kidd explains. "We will receive the cell samples from the patients, and we will analyze them to determine the methylation status of the *caspase 8* gene." Lahti adds, "It will tell us whether the drug is turning the gene back on and how well it's working."

Kidd and Lahti agreed that they would never have been involved in this discovery if they had not come to St. Jude. "We couldn't afford to," Kidd says. "That's really the bottom line; research scientists are limited by what funding they have." Lahti adds, "You can find something that looks very significant, but if you don't have the data to back it up, nobody wants to fund it. Getting that necessary data can be very expensive."

Kidd says, "ALSAC funding allowed us to …" "spend enough time on the caspase 8 story to bring it to the point where it was clearly fundable and we knew it was potentially important," Lahti says, finishing his sentence. Kidd added, "That's a real distinction about this institution. We've been here 10 years, and we enjoy it because we have the opportunity to do things we might not be able to do at other research centers." Finishing each other's sentences is common for Kidd and Lahti, who are not only research partners but also husband and wife.

"We have a 17-year-old son, and he's getting ready to go off to college," Kidd says. "When we first arrived at St. Jude he was only 7, and we realized, seeing the kids here, how very lucky we are to have a healthy child."

Lahti added, "We've told our son, 'If you can make just a small impact somewhere in the world during your lifetime then you will have been a success. As scientists, that's all we can hope to do. It's nice to know that our research here can provide some insight into something that might help treat children with specific tumors."

Both Kidd and Lahti hope that the demethylating agents will help make patients more responsive to therapy, but if not, other options are in the works. Their research team and others at St. Jude continue to discover new knowledge of important biological functions. They know that finding the answers to "why cells commit suicide" and other basic science questions will eventually lead to cures for childhood catastrophic diseases.●

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*John Cleveland, PhD, a member of the St. Jude Biochemistry department, was one of the first researchers to study cell death processes at St. Jude.*

# Perspective

## One St. Jude patient shares the lessons she learned through a battle with non-Hodgkin lymphoma.

By Danielle Truxillo

On March 10, 1993, only two months away from my eighth birthday, my family and I received information that would change our lives forever. I was told that I had non-Hodgkin lymphoma.

My first reaction was, "Oh, how could this happen to me? I didn't even know that kids could get cancer!" Until then, I had thought that only adults could get cancer. It was a shocking and scary thought that I could have this. I thought, "Will they cure me? Will I die?" At 7 years old, the last thing you're thinking about is dying, but I had to.

"I thought, 'Will they cure me? Will I die?' At 7 years old, the last thing you're thinking about is dying, but I had to."

*Danielle Truxillo*

My bout with cancer was very hard on my friends, but they stuck with me and I could never have gotten through it without them. They had no idea what cancer was and what could happen, but they were always there for me. I had to receive chemotherapy every Thursday for two-and-a-half years. I have learned that through God, my family and my friends I can handle anything.

I don't regret that my illness happened, because there are too many good things that have come out of it. Everyday problems don't bother me, because compared to battling cancer, they are insignificant. I have learned that I am a lot stronger than I had realized. I have learned who my true friends are and who means the most to me. There are many friends I would never have met if I had not gone to St. Jude. I lost some friends I made there, but the short time I had with them has changed my life in ways that I can't explain.

It is eight years later, and I am a healthy 16-year-old living a normal life. I love hanging out with my friends, shopping and working on St. Jude fund-raisers. Someday I hope to be a public relations director of a Nashville record company. But for now, I am thankful that I can just be a normal kid. Thank you, St. Jude!•

*Danielle enjoys drama and public speaking. She has been involved with the St. Jude Dream Home in Lafayette, Louisiana, and has worked with radio stations in several states during Country Cares for St. Jude Kids®.*

JERE PAROBEK

*St. Jude patient Sarah Johnson, St. Jude National Outreach Director Marlo Thomas and Board member Tony Thomas gather at the August 21 groundbreaking festivities for the Target House expansion. The event marked the beginning of construction for the 78,760-square-foot addition to Target House, a residential facility for long-term St. Jude patients.*

*Funded by Target Stores and its retail partners, Target House opened in 1999. It currently offers 50 furnished two-bedroom apartments and several common rooms, including the Tiger Woods Library, the Amy Grant Music Room, the Sergei Grinkov Garden and a playground sponsored by the PGA Tour Wives Association.*

*Scheduled for completion in November 2002, the expansion will add 46 additional apartment suites and several communal areas to Target House. New recreational facilities will include a relaxation spa and yoga room; the Scott Hamilton Fitness Center with child-sized equipment; the Tiger Woods Performance Pavilion; and the Scott Hamilton Arts and Crafts Room with an adjoining Art Gallery Wall.*

*The $16 million expansion brings to $27 million Target Stores' contribution to St. Jude.*