

ADAM LONG: The Fighter

**“St. Jude doesn’t give up
just because you develop
a second cancer.”**

PLUS: *Genome project’s new
brain tumor findings*

*A life-transforming
gene therapy trial*



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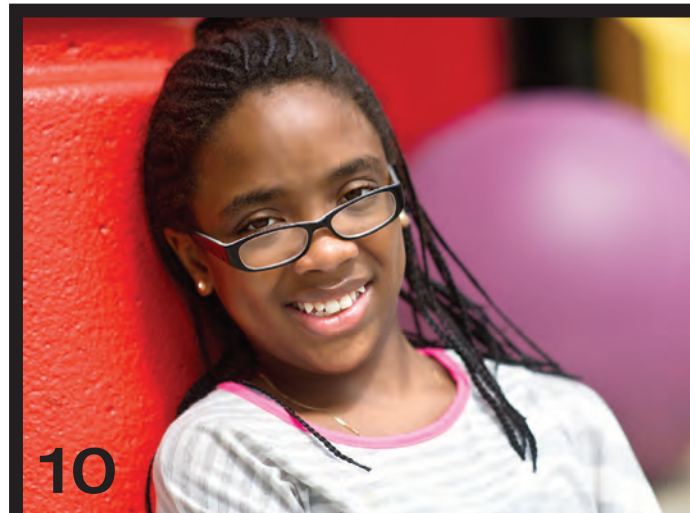
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Promise

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A Giant Step for

St. Jude researchers offer the first proof that gene therapy can reduce the symptoms of

BY ELIZABETH JANE WALKER

Chris Potwora doesn't remember life without hemophilia. He was just a little tyke when doctors realized that his blood failed to clot properly. For Potwora, a skinned knee could be dangerous. A tumble from a bicycle could be deadly. Football or other contact sports? Out of the question. As a result, the boy endured frequent injections of Factor IX, a protein that helped his blood clot.

"I used to go camping with my dad, and we'd take Factor IX along in the cooler," Potwora recalls. "It's something I've always dealt with, so I didn't know any different."

All that changed when Potwora spent a week at St. Jude Children's Research Hospital earlier this year. On Valentine's Day of 2012, he became one of the first people in the world to receive a novel kind of gene therapy.

After that, Potwora discontinued his regular injections of Factor IX.

A factor of nine

Hemophilia is an inherited disorder that primarily affects males. Because they lack an essential protein needed to help the blood clot, individuals with the disease may bleed profusely after minor injuries or may spontaneously bleed into their joints. About one in 30,000 boys inherits hemophilia B, which is caused by a mutated *F9* gene. These individuals lack sufficient amounts of clotting Factor IX. People with severe hemophilia require regular transfusions of the protein to prevent bleeding episodes. Besides being painful and inconvenient, the frequent injections are expensive, costing as much as \$400,000 a year.

Enter gene therapy.

For years, researchers believed that hemophilia B could be cured by adding a normal *F9* gene to replace the function of the faulty one. The healthy gene would then command cells to produce the missing Factor IX protein and—*voilà!*—the patient's blood would clot normally.

St. Jude hematologist Arthur Nienhuis, MD, and his colleagues have spent decades seeking the best method for delivering healthy genes into the body. The therapeutic gene could not be inserted directly into a cell; instead, it must hitch a ride with a carrier that could transport its cargo to the desired location. The logical vehicle would be a virus, which has a natural tendency to infect cells and replicate within them. If a virus could be engineered so that it could infect cells and introduce its genetic material but not replicate, then the normal *F9* gene could be

Gene Therapy

hemophilia B.

introduced into a target cell. This genetically engineered virus is called a vector.

One obstacle to using a viral vector is that a patient's immune system might attack and destroy the foreign invader. Scientists homed in on what is called an adeno-associated virus (AAV), a benign virus that does not cause disease in humans. When injected into the bloodstream, the AAV tends to travel directly to the liver, the site where Factor IX is normally produced.

Designing a unique vector

In the 1990s, St. Jude postdoctoral fellow Amit Nathwani, MD, PhD, and surgeon Andrew Davidoff, MD, began collaborating with Nienhuis to develop a gene therapy approach for hemophilia. The relationship continued when Nathwani later moved to University College London (UCL).

Davidoff, now St. Jude Surgery chair, says the success of the subsequent gene therapy trial is due in part to a vector design that is unlike any other. The research team, which included John Gray, PhD, of St. Jude Experimental Hematology, chose a virus called AAV8 to deliver the genetic material into the liver.

"Our vector design is unique in certain aspects,"

Davidoff explains. "All clinical trials before ours that used adeno-associated virus used a type called AAV2. Almost all humans have been exposed to that virus and have some degree of immunity against it. We chose AAV8, because only 5 to 10 percent of humans have been exposed to it. To qualify for our trial, patients could not have had prior exposure to AAV8."

Because the participants had never encountered AAV8, their immune systems would be less likely to recognize and attack it.

The vector used in the study was produced at the Children's GMP, LLC, which is located on the St. Jude campus. St. Jude was the first pediatric research center to have an on-site Good Manufacturing Practices facility. The Children's GMP produces biopharmaceutical products under government-approved manufacturing guidelines.

Because the gene therapy treatment must be perfected on adults before it could be used on children, the team approached UCL hemophilia expert Edward G.D. Tuddenham, MD, PhD, to recruit adult patients. Six men enrolled in the first phase of the study, which occurred in London. Each participant received a one-time gene therapy treatment that was delivered via a simple intravenous infusion.

Of the initial group of participants, two received low doses of the vector, two received intermediate doses and two received higher doses. Factor IX levels rose in

St. Jude researchers use adeno-associated viruses like these to deliver the healthy F9 gene into individuals with hemophilia B.

all of the men, with the ones receiving the most vector enjoying the highest increases. One high-dose recipient experienced a mild immune response in the liver, which was successfully quelled with short-term steroid treatment.

Read all about it

A *New England Journal of Medicine* report on the study generated international headlines. The clinical trial had offered the first proof that gene therapy could reduce the symptoms of hemophilia B. Four patients discontinued their regular protein injections altogether; the two who received the lowest doses required injections much less frequently than before the study.

The participants' lifestyles changed dramatically. For the first time in their lives, they could run marathons or play soccer without bleeding into their joints.

"Clearly it was a life-transforming experience, because they went from acquiring Factor IX infusions two or three times a week and in constant risk of bleeding to essentially being clinically normal," Nienhuis observes.

Although any level above 1 percent is therapeutically significant, the eventual goal of the hemophilia B trial is to achieve and sustain factor levels exceeding 15 percent. The study's participants continue to maintain levels ranging from 2 to 6 percent. Most importantly, those results have persisted for more than two-and-a-half years.

"This is clearly the first study that has documented long-term expression of a therapeutic transgene," Davidoff says.



Aspiring physician and hemophilia B patient Chris Potwora receives his gene therapy infusion under the watchful eye of St. Jude staff. "When I'm a doctor, I'd really like to see this be an option for treatment, because there are a lot of conditions it could help," he observes.



Discussing the St. Jude gene therapy project are (from left) Ulrike Reiss, MD; Andrew Davidoff, MD; Arthur Nienhuis, MD; and John Gray, PhD.

Looking ahead

The gene therapy study continues to accrue adult patients, all of whom receive high doses of the vector. Potwora was the first patient to receive his treatment at St. Jude. Ulrike Reiss, MD, of St. Jude Hematology notes that Potwora experienced a minor liver inflammation, which was treated with steroids. Potwora now takes Factor IX only after incurring an injury, such as when he recently broke his toe.

The trial's next phase will use a vector in which researchers have removed the viral particles that lack DNA. Davidoff believes this improvement will further reduce participants' immune reactions and will enable clinicians to deliver more genetic material into the liver. The modified vector is currently in production in the Children's GMP, LLC. Eventually the St. Jude team hopes to extend gene therapy to children with hemophilia B, as well as to individuals with Gaucher disease, hemophilia A and galactosialidosis.

For Nienhuis, a pioneer in the field of gene therapy, these trials are the culmination of his life's work.

"It's a grand experience, to see it come to fruition," admits Nienhuis, former president of the American Society of Gene Therapy. "If you had asked me 30 years ago whether we could ever treat a disease by simply injecting a virus into the bloodstream, I would have said, 'It's not likely.' But clearly the biology was very different from what we expected. It definitely works."

Potwora is adjusting to life without regular injections of Factor IX.

"It was weird getting used to it at first," admits the recent college graduate and future medical student. "I was interested in the clinical study because I didn't want to take the factor anymore, but as a pre-med student I also had an academic interest in gene therapy. I knew they need these kinds of studies in order for the field of gene therapy to move forward. I think it's really interesting from a scientific perspective and really helpful from a clinical one. When I'm a doctor, I'd really like to see this be an option for treatment, because there are a lot of conditions it could help." ●

The Positive Side of Life

For decades, St. Jude researchers and clinicians have been making progress against HIV/AIDS. That work continues today.

BY JOYCE M. HARRIS



Sharmain Mayes (at right) strolls through campus with her longtime social worker, Sylvia Sutton. Sharmain credits Sutton with helping her through her journey with HIV. “Miss Sylvia is always encouraging me to look at the silver lining,” Sharmain says. “I love that about her and about the other people who work at St. Jude.”

Sharmain Mayes has vivid memories of the day St. Jude doctors and her aunt explained the impact that three letters—H, I and V—would have on her life. Her clinicians underscored the importance of taking her medications regularly and making frequent clinic visits; her aunt emphasized that her family’s unconditional love would prevail.

Still, the more Sharmain learned about the human immunodeficiency virus (HIV) she had acquired at birth, the more she grappled with resentment about the stigma that society attached to the virus. “I was encouraged to keep it a



Patricia Flynn, MD (at left), director of Clinical Research in St. Jude Infectious Diseases, and Christine Sinnock, longtime St. Jude social worker in the HIV/AIDS program, continue working to dispel myths and ignorance about HIV/AIDS.

secret, because it would make my life extremely tough if people knew,” she says.

Sure enough, the teen was ostracized when she revealed her “secret” to trusted friends. She began taking her medications at times when her peers wouldn’t notice. Sharmain watched as the plates she had used at one meal were surreptitiously discarded. Her fellow college students brazenly whispered and stared upon discovering her status. Those were tough moments.

“People were unaware of HIV/AIDS and were scared of it,” she says. “My life was so negative, and I wanted so badly to see the opposite—the positive side of life.”

Sharmain escaped her reality through dance, music and inspirational novels that featured heroes, happy endings and healing. She also began competing in beauty pageants to boost her confidence.

Now living life on the positive side, Sharmain strives to inspire others who live with HIV/AIDS. Thanks to St. Jude research advances, she is celebrating 22 years of longevity against a disease that was once considered a death sentence.

“Growing up, I thought every city had a St. Jude,” Sharmain says. “How blessed am I to have been born in Memphis—in the epicenter of research for children with HIV/AIDS?”

The saga begins

The hospital’s roots in HIV/AIDS research began long before the U.S. reported its first case in 1981. In the early 1970s, a St. Jude pioneer had found a cure for the *Pneumocystis carinii* pneumonia that threatened the lives of immune-compromised leukemia patients.

Walter Hughes, MD, St. Jude emeritus faculty, screened more than 30 compounds before discovering the right drug combination to treat the deadly infection.

“We found several drugs that reduced the infection from 100 percent to 50 percent. That showed the drug had some activity, but we wanted to reduce that number to zero,” Hughes says. “So we kept

going and finally got trimethoprim-sulfamethoxazole.”

The drug was 100 percent effective in treating and preventing *Pneumocystis* in laboratory models, as well as in patients with cancer. Later studies by Hughes showed the drug had the same effect in individuals with HIV/AIDS, for whom *Pneumocystis* was the most frequent cause of death. Today, trimethoprim-sulfamethoxazole is the drug of choice when treating pneumonia in the approximately 33 million people worldwide with HIV/AIDS.

Hughes and his team of St. Jude researchers later developed the drugs dapsone and atovaquone, also standard treatments for preventing *Pneumocystis* in patients with HIV/AIDS. Recent data show that about 4.5 million HIV/AIDS patients are receiving one of the St. Jude drugs to prevent *Pneumocystis* pneumonia, in addition to the individuals who receive those drugs for cancer, organ transplants and congenital immunodeficiency.

A different Total therapy

Shortly after St. Jude founder Danny Thomas’ 1987 declaration that HIV/AIDS was a catastrophic disease of children, the hospital established a pediatric HIV/AIDS clinical program. Hughes recruited Patricia Flynn, MD, to help develop it.

“From the beginning, Dr. Hughes had the incredible insight to look at how treatment modalities similar to the ‘Total therapies’ that were being used for leukemia interventions would likely be necessary to combat HIV infection,” says Flynn, director of Clinical Research in the hospital’s Department of Infectious Diseases.

St. Jude began treating hemophilia patients who developed HIV and later expanded the program to focus on infants born to HIV-infected mothers. In 1992, the hospital received a federal grant to establish St. Jude as a National Institutes of Health Pediatric AIDS Clinical Trials Unit. The funding allowed St. Jude to participate in the first national, landmark study to reduce the transmission of HIV from mother to infant.

“It was a tremendous advancement,” says Flynn, who holds the Arthur Ashe Chair in Pediatric AIDS Research at St. Jude. “We had a few drugs that could be used to treat HIV infection, but we had no idea whether or not those drugs were safe to give to pregnant women. Would they be able to tolerate their potential toxicity? If so, did the drugs have any chance at successfully preventing the transmission of infection?”

The results were astonishing. The ACTG-076 study showed that HIV transmission was reduced by two-thirds when the antiretroviral drug zidovudine, or AZT, was given to infected women during pregnancy and to babies shortly after birth.

Mother-to-child transmission rates continued to decline nationally, with St. Jude helping reduce the numbers locally. In the past nine years, fewer than 20 babies have been born with HIV in the Memphis area. In 2010, only one baby was born to an HIV-infected mother. That number dwindled to zero in 2011.

Current research at St. Jude continues to monitor the long-term effects of therapy in infants who were exposed to HIV and the drugs to treat and prevent HIV infection but who do not have the virus themselves.

A holistic approach

As prevention improved in infants, a spike in HIV infection rates among teens and young adults in

the late 1990s led St. Jude to shift its focus and expand research and prevention programs targeting teens and adolescents. These included the Reaching for Excellence in Adolescent Care and Health (REACH) behavioral

study and the Adolescent Trials Group, which is funded by the National Institutes of Health. Through the latter, St. Jude and a network of community partners provide HIV education and intervention programs that target general and high-risk populations, encourage testing and help to de-stigmatize HIV/AIDS.

“We’ve moved away from the old days when patients had to take handfuls of pills three times a day,” says Christine Sinnock, a longtime social worker in

the St. Jude HIV/AIDS program. “Research has made it possible to treat the disease without the pill burden, with less frequency and minimal side effects. Yet, people are still dying of HIV because of the stigma and the secrecy.”

Sinnock says myths and ignorance about the disease continue to create barriers for patients trying to access care. Helping patients overcome their social struggles will continue to be just as critical to their survival as providing medications to prolong their lives.

“We have a holistic team of clinicians in our program to treat the whole person—not just the diagnosis,” Sinnock says. “Many of our patients are inner-city youth who come into treatment with a host of challenges, and we get an opportunity to try to turn things around for them.”

That’s where Sharmain steps in—frequently speaking to peer groups at St. Jude and in the community about how she overcame her past struggles and the burden of living with HIV/AIDS.

“From a negative situation came my positive outlook on life,” Sharmain says. “Who I am is not defined by my illness; it’s defined by my attitude. The people at St. Jude have shown me that I have options, and that I don’t have to sit in a corner and cry and think my life is over.

“My life is far from over.” ●

“The people at St. Jude have shown me that I have options, and that I don’t have to sit in a corner and cry and think my life is over. My life is far from over.”

Solving The Puzzle

BY CARRIE L. STREHLAU

Pediatric Cancer Genome Project scientists learn more about the subtypes of a deadly childhood brain tumor.



The team that made the medulloblastoma findings included (from left) Matt Parker, PhD, and Jinghui Zhang, PhD, both of Computational Biology; Giles Robinson, MD, Oncology; and Tanya Kranenburg, PhD, Chemical Biology and Therapeutics.

Seen from a few feet away, a puzzle's image appears to be one seamless piece. But upon closer examination, that image actually consists of many pieces.

In 2010, research led by St. Jude Children's Research Hospital investigators demonstrated for the first time that medulloblastoma—the most common malignant childhood brain tumor—is actually several different diseases, each arising from distinct cells destined to become different structures. The

medulloblastoma puzzle, thought to be one disease, was discovered to have many parts, or subgroups.

Recently, our researchers discovered genetic mistakes in three of the four subtypes of medulloblastoma. These mistakes involve genes that are already the focus of drug development. The results mark progress toward more effective treatments for medulloblastoma and other cancers. The most significant gene alterations are linked to subtypes that currently have the best and worst prognosis.

“Medulloblastoma, which arises in the back of the brain in a region called the posterior fossa, is diagnosed in about 400 children and adolescents each year, and their outcome varies based on the subtype they have,” says Giles Robinson, MD, a St. Jude oncologist involved in the study.

Groups three and four are the most common—group three making up 25 to 30 percent, and group four making up 40 to 50 percent.

“About 60 to 70 percent of the kids we see in clinic at St. Jude have group three or group four tumors. Unfortunately, these are the subgroups that we know the least about,” Robinson says.

Examining the pieces

Understanding more about medulloblastoma subgroups could help doctors direct treatment more accurately, improving effectiveness and reducing side effects for patients.

“Currently, we call medulloblastoma all one disease,” Robinson says. “Patients come in, and they get surgery, radiation therapy and then chemotherapy—no matter what subtype of medulloblastoma they have. This study has major implications for the way we look at medulloblastoma, and the way we’ll potentially treat medulloblastoma.”

The study also uncovered totally unexpected genetic abnormalities within the disease subtypes that point scientists in new directions for improving treatments.

“In the WNT subgroup, which includes patients with the best outcome, we found a completely novel mutation that had never been described in medulloblastoma before,” says the project’s leader, Richard Gilbertson, MD, PhD, director of the St. Jude Comprehensive Cancer Center. “We also uncovered a big clue as to what might be driving subgroup three and four disease. The mutations in these tumors appear to work together to trick the cancer into ‘thinking’ it is still a stem cell. The tumor cells, therefore, behave just like early developing cells, and proliferate.” Drugs targeting some of the culprits identified in this study are already under development for other diseases. This gives the St. Jude team a head start on identifying potential treatments.

Glimpsing the bigger picture

The medulloblastoma research is part of the St. Jude Children’s Research Hospital – Washington University Pediatric Cancer Genome Project. Launched in 2010, this



“Medulloblastoma has been an exciting story in pediatrics because we’ve learned a lot throughout the years,” says Richard Gilbertson, MD, PhD, director of the St. Jude Comprehensive Cancer Center. “The most exciting aspect of working at St. Jude is that it continually provides opportunities to better understand childhood cancers.”

ambitious project is deciphering the complete normal and tumor genomes of 600 childhood cancer patients. The genome is the complete set of instructions needed for human life. It is carried in the DNA found in nearly every cell.

The study involved sequencing the complete normal and cancer genomes of 37 young patients with medulloblastoma, which translates to more than 222 billion letters of DNA code. This makes it the largest such effort to date for this disease.

Researchers uncovered a number of mutations in genes that orchestrate other genes through a process known as epigenetic regulation. They then checked tumors from an additional 56 patients and found the same alterations.

The findings add to mounting evidence from the Pediatric Cancer Genome Project that epigenetic changes play a pivotal role in fueling childhood cancer. Epigenetic mechanisms can serve as on-off switches, altering gene activity without changing the gene’s makeup. Such changes can lead to the unlimited cell growth of cancer.

“Medulloblastoma has been an exciting story in pediatrics because we’ve learned a lot throughout the years,” Gilbertson says. “The most exciting aspect of working at St. Jude is that it continually provides opportunities to better understand childhood cancers. When we complete one project, one set of experiments, and you think you’ve gotten to the end, there is another door that we can go through. It’s another door into a completely new world of alterations and understanding of the disease.

“The important thing to remember is that every time you go through one of those doors at St. Jude, it impacts patients’ lives.”●



St. Jude research suggests the drug hydroxyurea offers twice the benefit to patients with sickle cell disease, including protection against life-threatening infections.

BY MARY C. POWERS

When it comes to medication, side effects are rarely good news. But St. Jude researchers searching for new ways to protect children with sickle cell disease from life-threatening infections may have found a welcome side effect. The scientists recently discovered that a drug used to ease the symptoms of sickle cell disease may also safeguard patients' health by protecting them against dangerous pneumococcal infections.

The drug is hydroxyurea. This inexpensive medicine has been used for years to ease the symptoms of sickle cell disease first in adults and more recently in children as young as 2 years old.

Hydroxyurea is best known for reviving production of fetal hemoglobin. Hemoglobin is the protein that red blood cells use to carry oxygen. Fetal hemoglobin is the main form of the protein at work during the first months of life until a protein known simply as hemoglobin takes over oxygen transport.

For children with sickle cell disease, the switch from fetal hemoglobin to hemoglobin marks the start of a life-long struggle with serious illness. These individuals inherit a mistake in the instructions for

assembling hemoglobin. The mistake leaves them at risk for a variety of health problems, including episodes of acute pain, a pneumonia-like illness called acute chest syndrome, strokes and other problems that are all associated with early death.

"Infections are one of the most serious threats to children with sickle cell disease. Our results suggest that hydroxyurea might reduce some of that risk even as it protects against organ damage by increasing production of fetal hemoglobin," says Jason Rosch, PhD, of St. Jude Infectious Diseases.

Living with sickle cell

About 300,000 individuals worldwide have sickle cell disease. The disease leaves them at a 400-fold increased risk of death due to pneumococcal infection. Immunizations to prevent the infection combined with a daily dose of penicillin to squash it early have helped to reduce, but not eliminate, the risk for patients like Faith Maxwell Brown of Memphis.

Today, Faith is a 13-year-old with a ready laugh who enjoys teasing her mother good-naturedly about which of them does a better job of remembering to take

medicine as directed. Faith enjoys ballet, dreams of becoming a pediatrician and sometimes has a hard time taking it easy during the temperature extremes that can trigger serious symptoms in sickle cell patients.

Doctors discovered Faith had sickle cell disease shortly after her birth. Almost immediately, she began taking penicillin to ward off infections. Yet she was hospitalized repeatedly with fevers as an infant and toddler. She was just a month shy of her second birthday when a pneumococcal infection invaded her bloodstream and led to meningitis and a 10-day stint in the hospital. The event caused significant hearing loss in her left ear.

Faith remembers little of the ordeal, but Velma Brown says her daughter needed rehabilitation even after she left the hospital to recover her strength and mobility. Mother and daughter prefer to focus on Faith's progress, including her ability to manage her disease and take medication as directed.

"She's at the age when she wants to go here and there. There are lots of school trips. I have more confidence now that she'll do what she has to do to manage her sickle cell," Velma says. That includes taking the daily dose of hydroxyurea she began in 2005.

When mother and daughter look at Faith's red blood cells under the microscope now, they cannot believe the difference. "To see those cells go from something that looks like a banana to something that looks nice and round was like a miracle. I couldn't believe it," Velma says.

Satisfying side effect

Rosch and former St. Jude researcher Jeffrey Lebensburger, MD, are interested in hydroxyurea's impact on the immune system, particularly white blood cells known as neutrophils that help drive inflammation.

Inflammation is usually an important part of

the disease-fighting immune response. Individuals with sickle cell disease, however, are at risk for an exaggerated inflammatory response that can damage healthy tissue and lead to life-threatening complications.

Scientists have known for years that along with increasing production of fetal hemoglobin hydroxyurea reduces the number of neutrophils. The most common type of white blood cells, neutrophils play a key role in the body's defense against bacterial and other infections.

A casual conversation over coffee one day inspired Rosch and Lebensburger to explore the anti-inflammatory properties of hydroxyurea.

That decision led to the first evidence of how a drop in neutrophils might protect against life-threatening pneumococcal pneumonia. Working in a laboratory model, researchers showed that hydroxyurea led to a drop in production of a molecule that helps neutrophils stick to the lining of blood vessels and begin moving to the site of the infection. The same molecule that helps neutrophils leave the blood stream to fight the infection is known to be elevated in patients with sickle cell disease. The molecule is named E-selectin.

When researchers checked blood samples from St. Jude patients enrolled in a national study of hydroxyurea, they found levels of E-selectin dropped following hydroxyurea therapy.

"Suddenly it looked like this drop in the neutrophils count, which had been dismissed as just a side effect of the drug, might be able to reduce the infection risk in these patients as well and not just for pneumococcal infection," Rosch says.

Researchers are now studying whether hydroxyurea impacts the infection risk facing patients such as Faith. It is the kind of research that might make Faith even more conscientious.

"Whenever I get tired of taking medicine, I just remind myself of how much it is helping me," she says. ●



Jason Rosch, PhD, of St. Jude Infectious Diseases (facing page) and his colleagues discovered that the drug hydroxyurea may protect patients with sickle cell disease from certain kinds of dangerous infections. That's great news for children such as Faith Maxwell Brown (at left) who survived a harrowing battle with a pneumococcal infection and subsequent meningitis.

GRAND SLAM

St. Jude hits one out of the park, helping children with Hodgkin lymphoma avoid treatment-related health problems.

BY ELIZABETH JANE WALKER

To a competitive baseball player, the flashy silver ring on Hunter Taylor's slim hand symbolizes grit, determination, victory. "It's a finals ring," explains the young shortstop, who aspires to a professional baseball career. For an agile teen with a strong throwing arm, anything is possible. After all, Hunter has already beat Hodgkin lymphoma, a cancer of the lymph system. How difficult can it be to make it to the major leagues?

Thanks to his team at St. Jude Children's Research Hospital, not only has Hunter reached home plate, but he has done so without undergoing radiation therapy or harsh chemotherapy.

Strike one

When a knot arose on Hunter's upper leg in the fall of 2010, he assumed he had been hit with a baseball—a common occurrence for a boy who played the game for hours on end. But the nodule persisted, prompting a visit to the pediatrician and then to the hospital. A biopsy indicated that Hunter had Hodgkin lymphoma, a cancer originating in immune-system cells called lymphocytes. The disease generally moves from one group of lymph nodes to the next. Fortunately, Hunter's cancer was discovered before it could spread beyond the primary location.

When he arrived at St. Jude, physicians confirmed that Hunter had a low-risk form of Hodgkin lymphoma.

The boy enrolled in a clinical trial designed to minimize his risk of developing serious health problems later in life.

Since St. Jude opened its doors in 1962, the survival rate for children like Hunter has increased from 50 percent to about 95 percent. But for many of those children, survival has come at a high cost. The chemotherapy and radiation treatments required to eradicate the cancer can cause problems years—even decades—later. Many patients have developed heart problems, infertility or second cancers.

The consequences for females have been especially daunting. "For girls with Hodgkin who received chest radiation, the risk of secondary breast cancers in the future was extremely high," says Monika Metzger, MD, of St. Jude Oncology. "We could cure most children with Hodgkin lymphoma. But at what price?"

A novel game plan

St. Jude researchers were determined to maintain or improve Hodgkin's excellent survival rates while reducing the long-term side effects of treatment. As a result, Hunter and 87 other children enrolled in a multicenter trial aimed at tailoring treatment. The patients in this study all had a favorable-risk form of Hodgkin in which the cancer had spread to less than three lymph node groups. None of the participants had experienced the weight loss, fatigue and night sweats that are often associated with a worse outcome.



With Monika Metzger, MD, on his team, Hunter Taylor handily beat Hodgkin lymphoma without undergoing radiation therapy or harsh chemotherapy.

The children received four chemotherapy drugs for 16 weeks. St. Jude investigators chose drugs that would not place survivors at significant risk for health problems later in life. If a patient's tumor shrank at least 75 percent following the first eight weeks of treatment, that child did not receive radiation therapy. Children whose cancer did not respond favorably to the chemotherapy received low-dose irradiation. More than half of the patients in the study were able to avoid radiation altogether.

"I didn't feel bad during my treatment," Hunter recalls. "It was fun to come to St. Jude. I got to be homeschooled for six months, and I didn't miss a single baseball game."

Home run

All of the study participants who avoided irradiation were still alive five years after their initial treatment. Results of the study recently appeared in the *Journal of the American Medical Association (JAMA)*. Metzger and her colleagues are working feverishly to further

improve outcomes. St. Jude has continued to tweak the chemotherapy regimen, replacing the four-drug, 16-week treatment with a seven-drug, eight-week treatment.

"Instead of having 50 percent of low-risk patients who do not get radiation, our aim is to have 60 or 70 percent of them avoid radiation," Metzger explains. "We're also looking at our intermediate-risk patients and trying to help them avoid radiation. We're using a strategy similar to the one we used in the low-risk study. We think we'll be able to safely omit radiation altogether for those who are in complete remission after two cycles of chemotherapy. It looks very promising."

Hunter now visits St. Jude every six months, leaving him plenty of time for baseball, hunting and other activities. The 13-year-old and his baseball team have competed in 70 games thus far this year—traveling thousands of miles and amassing more runs than any other team in the state. The young shortstop is strong; he's healthy. And he's looking forward to—what else?—the next baseball season.●

The Fighter

Five times, Adam Long has heard the words “it’s cancer.” Five times—with the help of St. Jude—he has chosen to fight.

BY ELIZABETH JANE WALKER

Face beaded with perspiration, Adam Long shuts his eyes in fierce concentration and hoists a massive stack of metal plates to its highest position. As the weights descend with a restrained clunk, Adam exhales, pulls out his earphones and smiles.

“Years ago, they told me I wouldn’t be able to lift heavy weights,” he says. “I decided to prove them all wrong.”

The clank of iron plates, the scent of dried sweat, the rhythmic exhalations fill Adam with a sense of accomplishment, a feeling of control. “I’m a fighter,” he explains. Indeed, for 13 years, Adam has been locked in a battle for his life. St. Jude Children’s Research Hospital has helped him shoulder that load.

The battle begins

Adam’s core of resilience was forged in the second grade, when he lost his 29-year-old mother to breast cancer.

“My mom was strong; she didn’t show weakness or fear.

She knew she probably wouldn’t be here to see me grow up, so she tried to teach me everything she could,” Adam recalls. “After she passed away, my dad went through a bad time. I had to be his rock and help take care of my little brother, so I dropped all the little-kid stuff.

“I was grown up at 7.”

Three years later, Adam hurt his left arm in a bicycle wreck. When the pain persisted, his grandmother took him to the hospital. The subsequent cancer diagnosis hit Adam like a punch to the gut. Unlike most 10-year-olds, he understood all too well what was at stake.

“Everything was surreal,” he says. “I kind of broke down, and then I changed totally. It was a fight-or-flight type of response. Instead of being down about it, I thought, ‘I might as well start fighting immediately. I can’t leave my family, because they depend on me.’”

When he arrived at St. Jude, Adam learned that he had a bone



tumor called osteosarcoma. Several months of chemotherapy treatments were followed by limb-sparing surgery to replace his entire left humerus and shoulder.

Afterward, he put the ordeal firmly behind him. “I got my fair share,” he told himself. “I’m done.”

Fight or flight

For the next 10 years, Adam pursued an active lifestyle, excelling in academics and graduating from high school. The teenager led worship services and served as a counselor at church camp; he learned to play the guitar and began working as a personal trainer. He also fell head-over-heels for a girl named Rachel.

Adam exercised constantly, running six miles a day, leg



Adam is thankful for the donors who have helped defray the costs of his repeated bouts with cancer—from the time he was a little guy (at right) to the present day. “I don’t have a lot of income,” he says. “If St. Jude hadn’t paid for my treatment, I wouldn’t be here, honestly.”

pressing up to 1,200 pounds and bench pressing more than 200. “I was very vain back then,” he admits. “I thought I couldn’t be touched because I was so strong. It was crazy to think that cancer would happen again.”

In the summer of 2009, Adam was executing an overhead lateral pullover when he heard the bone crack in his right arm. Immediately, he assumed that he had placed too much stress on his arm and had incurred a hairline fracture.

“They’ll put it in a cast, and I’ll get back to training as soon as I get out of the cast,” he thought. But X-rays indicated a bone lesion. He had a separate, unrelated case of osteosarcoma.

“I wasn’t ready to go through it again,” Adam admits. “But at the same time, I had faith that I was going to get through it. I thought, ‘God’s not going to bring me through it once to have me fail a second time.’”



“Once again, I went into that fight-or-flight mode. I said, ‘Well, let’s go. Let’s kill it. Let’s get it over with.’”

In the genes

Back in 1999, Adam’s St. Jude oncologist, Sheri Spunt, MD, had

tested Adam to determine whether he had a mutation of the *p53* gene. Individuals with that genetic defect are at high risk of osteosarcoma as well as breast cancer. At that time, the results were negative. Ten years later, Spunt was determined to get to the bottom of the mystery.

“There has to be some underlying genetic reason why this kid has had two separate cancers and why his mom died at an early age of breast cancer,” she said. Fortunately, genetic testing had advanced during the preceding decade. This time, the test indicated that Adam had the *p53* mutation.

“It doesn’t affect his treatment or his outcome—patients who have the mutation fare the same as patients who do not have the mutation,” Spunt explains. “But it means that Adam’s personally at risk for developing other cancers as he gets older. It also has potential implications for other members of

his family who may have inherited the gene but may not have manifested the condition yet.”

Adam met with the hospital’s genetic counselor so that he could better understand his risks as well as those to his brother. He also received chemotherapy and underwent a second limb-sparing operation, this time on his right arm.

“OK, I’m done,” he told himself.

A lesson in perspective

About a year later, he and Rachel were riding a Jet Ski when he tumbled into the water, injuring the upper part of his right arm. “I’m sure it’s a torn muscle,” Adam assured his girlfriend.

But the knot was a tumor. Adam underwent a third operation and intensive radiation treatments. All seemed well for about nine months. Then a CAT scan indicated spots on Adam’s right lung.

Surgeons removed those lesions, later discovering new ones in the left lung. Adam underwent his fifth surgery in the summer of 2011.

Then Spunt enrolled Adam in a new clinical trial designed specifically for patients at least 15 years of age, whose osteosarcoma has spread to the lung but whose lung nodules have been surgically removed. Neither Spunt nor Adam knew whether he would receive the investigational drug or the placebo.

“I hope the information they learn from me will help other kids,” Adam says. “It’s tough to deal with cancer over and over again. I wouldn’t want anyone else to have to go through it, especially young kids.”

“That’s a typical example of Adam’s selflessness,” Spunt says. “He was willing to participate in the study because he knew it would help other people even if it didn’t help him.”



“I hope the information they learn from me will help other kids,” Adam says. “It’s tough to deal with cancer over and over again. I wouldn’t want anyone else to have to go through it, especially young kids.”

Nurse Practitioner JoAnn Harper says she draws strength from Adam's courage, persistence and honesty.

"Adam has given me great perspective," she says. "You may have issues in your life that you think are a big deal. But all you have to do is look at Adam and see everything that he has overcome—and know that if he can do it, then you can overcome your issues, too."

Adam credits his medical team for helping him cope with the challenges he has encountered in the past 13 years. "Dr. Spunt is among the greatest people that I've ever met," he says. "She and nurse JoAnn have pulled me through so much, and they've given me hope time after time."

Keep fighting

Adam admits that his experiences have had a profound influence on his attitude.

"To be told over and over again that I have cancer has torn me down and built me up at the same time," he explains. "When I got cancer the second time, it totally took apart the person that I was and made me a different person. I'm a lot stronger now, which I didn't think was possible. I see things differently: I'm thankful; I pay attention to detail; I stop to listen. I see people a lot differently, as well. I work in a bookstore, where I get to talk to people every day. I feel like I can touch them without even telling them what I've been through."

Recently, a bookstore customer confided to Adam that her son had osteosarcoma. When Adam asked about the boy's treatment, the woman noticed the scars on his arms and realized that he was a cancer survivor.



"St. Jude doesn't give up just because you develop a second cancer," says Sheri Spunt, MD. For 13 years, Adam and his medical team have joined forces to battle the challenges that come his way.

"My attitude was, 'Hey, your son can get through it; see these scars? The scars don't matter. No matter what, you've just got to keep fighting and don't give up,'" Adam says.

During a checkup a few months ago, Adam gave his doctor a scare. He had lost 10 pounds since his previous visit. Spunt's heart sank.

"I thought, 'Oh, no—maybe this drug is having a bad side effect,'" she recalls. "But when I walked into the examination room, Adam was grinning from ear to ear. He told me he was training for

the St. Jude Memphis Marathon and had been running a lot of miles. That's why the weight was coming off."

Adam laughs at the memory. "Yeah, I've had two lung surgeries, so I figured it would be a good goal to do the full marathon in 2013.

"I've got a lot of training to do."●

Editor's note: Just before press time, Adam learned that he has developed yet another cancer, this time a brain tumor.

Once again, the fight is on.

Giving Thanks, Sharing Hope

BY LEIGH ANN ROMAN

The St. Jude *Thanks and Giving* campaign reaches out to raise money and awareness.

Berta Mendez first heard of St. Jude Children's Research Hospital when she saw a Spanish-language television spot with singer Luis Fonsi for the St. Jude *Thanks and Giving*® campaign.

Two weeks later her daughter, Ana, 8, was found to have acute lymphoblastic leukemia, the most common childhood cancer. "In that moment, the word 'death' came into my mind," Berta says.

Then she started thinking about the hospital she had seen in the commercial. Could there be a reason that she noticed that ad among the thousands of commercials on TV during the holidays? Grasping a sliver of hope, Berta asked her doctor in Kansas for a referral to St. Jude.

Three years later, Ana is 11 and has recently completed chemotherapy at St. Jude. During treatment, she starred in a St. Jude *Thanks and Giving* television spot with George Lopez. According to her mother, Ana was "super proud" to be part of the campaign so she could give hope to other children.

Since its inception in 2004, the St. Jude *Thanks and Giving* campaign has raised money and awareness to provide hope and help for children like Ana. And no family ever pays St. Jude for anything.

The St. Jude *Thanks and Giving* campaign—created by Marlo, Terre and Tony Thomas, the children of St. Jude founder Danny Thomas—has raised more than \$312 million since it began. This unique campaign unites more than 60 brands nationwide that encourage their customers to give to St. Jude through add-ons at the register or by purchasing specialty merchandise during the holiday shopping season.

Partners in the campaign include Kmart, CVS/pharmacy, ANN INC., DICK'S Sporting Goods,

Kay Jewelers, Target, GNC, Williams-Sonoma Inc., Domino's Pizza and many more.

"I am so grateful to the amazing group of partners that have come together for the past nine years for our St. Jude *Thanks and Giving* campaign" says St. Jude National Outreach Director Marlo Thomas. "Their support helps ensure that St. Jude can continue the lifesaving research and care that has brought hope to so many families and helps bring us closer to the day when my father's dream—that no child shall die in the dawn of life—becomes a reality."

The St. Jude *Thanks and Giving* message is simple: "Give thanks for the healthy kids in your life and give to those who are not."

Beginning in November, shoppers will see the St. Jude logo identifying retailers who are joining the battle to save children fighting cancer and other life-threatening diseases. Employees at these companies will help raise as many donations as possible to support the hospital.

Each year, influential television spots for the campaign feature patients with Marlo Thomas, as well as celebrity friends Jennifer Aniston, Robin Williams, Shaun White, Sofia Vergara, Michael Strahan and Puerto Rican musician Luis Fonsi. These memorable spots air on broadcast and cable networks and online. In addition, the celebrities are featured in a movie trailer that shares the St. Jude story nationwide in theaters including Regal Entertainment Group, Cinemark USA, Carmike Cinemas and many more.

The fundraising efforts are reinforced with a national blitz of media including television appearances by St. Jude patients and Marlo Thomas. Marlo will also



Marlo Thomas and St. Jude patient Yazleemar Gonzalez Santana share the joy and wonder of the holiday season.



"Even though I arrived at St. Jude with the word 'death' on my mind, that has changed completely," says the mom of Ana Mendez. St. Jude *Thanks and Giving* raises awareness and funds for the hospital that provided that hope to Ana and her family.

appear on NBC's *TODAY* show for five consecutive days during Thanksgiving week to share heartwarming stories about St. Jude patients and the hospital's work.

It's easy to get involved in the campaign. Donors can shop wherever they see the St. Jude logo; visit stjude.org and make a donation or send e-cards in honor or memory of loved ones; join the campaign on Facebook; or register for the St. Jude Give thanks. Walk.™—a 5K walk that serves as the kick-off to the St. Jude *Thanks and Giving* campaign November 17 in 90 cities nationwide.

As Ana's story shows, the campaign raises awareness as well as funds for St. Jude, which treats children fighting cancer and other life-threatening diseases with pioneering research and exceptional care.

Today, Ana is a happy young girl who loves roller-

skating and watching *Hannah Montana*. Throughout her treatment, she kept up with her schoolwork through the St. Jude School Program Presented by Target. She will celebrate her 12th birthday Christmas Day.

There is no place like St. Jude, Berta says, noting that the hospital also helped Ana's siblings through the Child Life and Social Work programs.

"Even though I arrived at St. Jude with the word 'death' on my mind, that has changed completely," she says. "At St. Jude I almost feel like we are adopted, that we have a family." ●

To learn more about the St. Jude Thanks and Giving campaign, please visit stjude.org. There you will find a complete list of St. Jude *Thanks and Giving* partners with details about where to shop and how to donate. You can also donate now by calling 1-800-4STJUDE.

Research Highlights

Closing AML's age-related survival gap

Modern, risk-adapted therapies are shrinking the survival gap between younger patients with acute myeloid leukemia (AML) and adolescents and teenagers battling the same disease, according to a St. Jude analysis.

Patients treated as part of the most recently completed St. Jude AML protocol enjoyed similar, high survival rates regardless of their age. Older patients were also just as likely as children ages 9 and younger to be cancer free three years after diagnosis. The results are an improvement from the 1990s, when AML patients ages 10 through 21 fared worse than younger patients at St. Jude and nationwide.

The past decade has brought a marked improvement in survival for pediatric AML patients, including older patients.

"In this study we show for the first time that there is no longer a significant difference in outcome between younger and older patients with this disease and that the relapse rates are nearly identical," said Jeffrey Rubnitz, MD, PhD, of St. Jude Oncology. Rubnitz is the first and corresponding author of a report on the study, which appeared in the journal *Cancer*.

The challenge now is to reduce treatment-related deaths, which are nearly three times more likely to strike adolescent AML patients than their younger counterparts.

Discovery may yield new flu drugs

St. Jude scientists have reported details of how certain drugs can target and inhibit an enzyme essential for replication of the influenza virus. All strains of influenza require the enzyme. Researchers believe their findings will yield drugs that can effectively treat new strains of the virus, which may be resistant to current antiviral treatments. The findings may also help scientists develop drugs that impede the virus' ability to develop drug resistance in the first place.

Stephen White, DPhil, chair of the hospital's Structural Biology department, and Thomas Webb, PhD, of St. Jude Chemical Biology and Therapeutics, were senior authors of a report on this study, which appeared in the journal *PLoS Pathogens*.

Researchers will use information gleaned from this study to design improved compounds that could be drug candidates for pre-clinical and clinical testing. The St. Jude team will work with a pharmaceutical company to further develop and test drugs. Once in clinical use, the drugs would offer a valuable and widely used first strike against the influenza virus.

"In this study we show for the first time that there is no longer a significant difference in outcome between younger and older patients with this disease and that the relapse rates are nearly identical."



Ready, aim, get silly

St. Jude patients take aim during a Silly String war held as part of the annual Silly Field Day hosted by the hospital's Child Life program. Research has shown that play promotes children's growth and development, and helps patients to continue achieving developmental milestones while receiving treatment. Each summer, Silly Field Day provides an eagerly anticipated stress-buster for kids and families, as well as staff.



Exploring the life and death of cells

St. Jude-led research provides new evidence of how a protein complex functions like a puppet master during embryonic development, determining not only if cells live or die but possibly the nature of that cell death as well.

The complex includes the proteins FADD, caspase-8 and FLIP. Investigators showed that these and other proteins in the complex work together to prevent programmed cell death. The same complex can also block activity of an enzyme that is linked to another cell death pathway. The findings offer clues into how cells foil the spread of viral infections and possible strategies for prompting malignant cells to self-destruct.

The results also provide insight into normal development and further the understanding of both the protein complex and a form of cell death called necrosis. Until recently, necrosis was considered to be an un-programmed form of cell death resulting from an accident or injury. Now, however, it is viewed as a distinct form of cell suicide the body uses to rid itself of damaged, dangerous or unneeded cells.

A report on this topic appeared in the journal *Cell Reports*. Douglas Green, PhD, St. Jude Immunology chair, and postdoctoral fellow Christopher Dillon, PhD, were corresponding author and first author, respectively.

Survivors' fracture risk lower than anticipated

As childhood cancer survivors head into middle age, they are no more likely than their siblings to report having broken bones. That finding is good news for the growing ranks of pediatric cancer survivors.

Earlier studies suggested that adult survivors of childhood cancer might be at particularly high risk of fractures due to diminished bone mineral density and other bone changes caused by irradiation or certain chemotherapy agents. But the largest study yet of adult survivors of childhood cancer suggests that is not the case. After adjusting for factors such as age, ethnicity,

smoking and use of medications to promote bone health, childhood cancer survivors were less likely than their siblings to report having broken at least one bone in their lifetime.

Carmen Wilson, PhD, a postdoctoral fellow in St. Jude Epidemiology and Cancer Control, was the first and corresponding author of an article on this project, which was featured in the journal *Cancer*. The research was part of the Childhood Cancer Survivor Study, a federally funded collaboration headquartered at St. Jude that includes 30 U.S. and Canadian institutions.



Celebrating in style

St. Jude continued its yearlong 50th anniversary celebration with an official ribbon-cutting ceremony for the Danny Thomas/ALSAC Pavilion, which recently underwent a renovation. From left, Tony, Terre and Marlo Thomas tour the facility with St. Jude patient Miguel Betances Lee.

Research Highlights

Taking aim at bacterial infections

Research led by St. Jude scientists has identified a possible new approach to defeating bacterial infections by targeting an innate immune system component in a bid to invigorate the immune response.

Despite the availability of antibiotics, bacterial infections continue to exact a heavy toll of suffering and death. A better understanding of how the immune system recognizes and responds to infectious agents will aid efforts to develop new, more effective treatments. In the St. Jude study,

researchers demonstrated the primary function of an innate immune molecule named NLRP6 and showed how the protein works to impede bacterial clearance.

“This discovery offers a completely new approach to fighting infections by targeting the host immune response rather than the bacterium,” said Thirumala-Devi Kanneganti, PhD, of St. Jude Immunology. She was senior and corresponding author of a report on this study, which appeared in the scientific journal *Nature*.

Healthy weight is best

St. Jude research indicates that overweight and obese children are less likely than those of normal weight to survive acute myeloid leukemia (AML) and more likely to die from treatment-related infections.

The study also found underweight patients had higher rates of treatment-related mortality and lower rates of survival than patients with healthy body mass indexes (BMIs).

“Although survival rates for pediatric AML have

improved in the last 25 years, they remain below 80 percent. These results suggest BMI may help us identify patients who are at higher risk for infections and who might benefit from additional supportive care,” said Hiroto Inaba, MD, PhD, of St. Jude Oncology. He is the first and corresponding author of the study, which was published in the journal *Cancer*.

Researchers found a significant connection between BMI and overall survival, even when other disease risk factors were taken into consideration.

Radiation dose tied to colorectal cancer risk

St. Jude researchers recently discovered that the colorectal cancer risk facing aging childhood cancer survivors is linked to the dose of abdominal radiation they received as children and the amount of colon that was irradiated.

Although previous studies linked childhood radiation therapy to an increased risk of second cancers, this analysis showed the risk of colorectal cancer was associated with the radiation dose. Scientists reported for the first time that the greater the volume of colon tissue exposed to radiation, the greater the risk of colorectal cancer. Treatment with drugs known as alkylating agents was associated with a nearly nine-fold increased risk of secondary colorectal cancer.

The results underscore the importance of cancer screenings and possibly the need to revisit current screening guidelines. “Colonoscopy offers a proven method of detecting colorectal cancer early, offering survivors and others their best chance of cures,” said Kerri Nottage, MD, of St. Jude Hematology, co-first author of a report in *Journal of Clinical Oncology*. “Yes, childhood cancer survivors are at higher risk of developing this cancer, but they can take steps to protect themselves.”



David McKee leaves mighty legacy

St. Jude and ALSAC mourn the death of David L. McKee, who served ALSAC for 35 years in positions that included interim CEO and chief operating officer.

McKee, who died August 17, was instrumental in the creation of a number of fundraising programs and initiatives, including *Country Cares for St. Jude Kids*, one of ALSAC's most successful fundraising programs. Recipient of the 2011 Lifetime Achievement Award by *Fundraising Success* magazine, he helped lead ALSAC to record growth and its current status as the second largest health care charity in America.

Gifts to St. Jude in memory of McKee may be made by visiting fundraising.stjude.org/goto/davemckee or by calling (800) 873-6983.



St. Jude patients Lanasha Gray (at left) and Carly Suchy pay rapt attention as Brad Martin reads a book he authored, *Myles' Pesky Friends*. "Even though these children are patients at St. Jude, they are still kids first and foremost," Martin says.

The Business of Caring

For entrepreneur **Brad Martin**, St. Jude is a worthy investment of both money and time.

BY KERRY HEALY

Brad Martin is man who knows business. As a real estate mogul and department store magnate, his career has taken him to the top of the corporate ladder. Along the way, this successful entrepreneur has always made caring about the children of St. Jude Children's Research Hospital an important part of his business, too.

"I have a passion for young people," Martin admits. "My wife and I are blessed to have five sons and four grandchildren who are healthy, so we also care deeply about the fact that St. Jude is focused on finding cures for childhood cancer. There is no better cause to support."

As a high school student growing up in Memphis, Martin was well aware of St. Jude and its work. "I was always interested in doing things that would benefit the hospital," he recalls.

The first opportunity came when Martin, the youngest person elected to the Tennessee House of Representatives, was able to sponsor legislation in 1979

and 1980 to help fund lodging for St. Jude families.

Later, as the CEO of the department store chain Saks Inc., Martin answered a call for help from St. Jude National Outreach Director Marlo Thomas and led his company's participation in the St. Jude *Thanks and Giving* campaign.

Today he serves as chairman of a private investment company and continues to give generously through his family's foundation, which recently funded the St. Jude Eye Clinic in honor of Barrett Haik, MD, chief of the hospital's Ophthalmology Division.

"I recognize the vital importance of the research St. Jude is doing, and I wanted to recognize Dr. Haik's incredible commitment to the hospital and his fantastic work on behalf of the children," Martin explains.

In 2010, Martin also added the accomplishment of children's author to his already distinguished resume. Once again, he accepted an opportunity to serve the children of St. Jude, this time

in a more personal way, when he visited the hospital to read his book, *Myles' Pesky Friends*, to the patients.

"It was a great opportunity to be around some special kids and their families and to understand that even though these children are patients at St. Jude, they are still kids first and foremost," he says.

In addition to the personal connection he feels to the children, Martin says he can see some of his own business philosophy reflected in St. Jude.

"My principal career activities have involved providing a high level of service, and St. Jude is also all about extraordinary service. In addition, I'm always focused on performance and return on investment of time and money. From that standpoint, St. Jude is one of the best investments one could make."

Through his leadership, generosity and dedicated support for the children of St. Jude, Brad Martin has shown that caring can be a business all its own. ●

Perspective

BY WARREN MOON

Keeping an Eye on the Goal

Find your own way to make a difference.



Warren Moon joins St. Jude patients (from left) Courtney Davis, Hutch Mohr and Trevor Tredaway in friendly competition during a tour of Memphis Grizzlies House, the hospital's short-stay housing facility.

I visited St. Jude Children's Research Hospital for the first time last year after hearing about the amazing work being done there by scientists and clinicians. I really didn't know what to expect, but I was blown away by the whole experience—especially the positive attitude of the patients and the welcoming environment the hospital provides as they undergo treatment.

My first stop was Target House, where I visited with patients and families who stay there while receiving long-term treatment. I was impressed by the children's personalities and the courage and the bravery that they displayed. Some of these kids had been receiving treatment for months, yet they maintained positive attitudes. In life, just as in the game of football, it helps to have a positive frame of mind to get over any type of obstacle.

Walking through the halls of St. Jude, you wouldn't think you were in a hospital if you didn't see doctors

walking around. It felt more like a home than a hospital.

I also had the opportunity to visit laboratories, where I witnessed some of the research being conducted not only on cancer but also sickle cell disease, which is important to me because of its prevalence among African Americans.

During my tour, I learned that it takes \$1.8 million to keep the hospital operating each day. Most of that money is generated by donations. As I was visiting the different areas of the hospital, I began to think of ways that I could help raise money for St. Jude.

Those thoughts developed into the St. Jude Warren Moon Hall of Fame Invitational golf tournament, which was timed to coincide with the National Football League's Pro Bowl Game in January of this year. We had a great day of golf on the Hawaiian island of Oahu. Four-person teams competed in a scramble format, with all proceeds benefiting St. Jude. The foursomes featured current and Hall of Fame players such as Eric Dickerson, Larry Fitzgerald and Tony Gonzalez. A party for Pro Bowl players the night before the tournament also served as a fundraiser.

I was happy to help St. Jude in my own way, and I would encourage anyone who wants to make a difference to do the same in their own way.

Seeing the work done at St. Jude was a life-changing experience for me. St. Jude is also changing the lives of children by taking situations that seem hopeless and turning them into positive stories because of great treatment and research.

Warren Moon is the only player inducted into both the Pro Football Hall of Fame and the Canadian Football Hall of Fame. A former quarterback for the Houston Oilers, Minnesota Vikings, Seattle Seahawks, Kansas City Chiefs and the Edmonton Eskimos, Moon currently works as an analyst for the Seahawks' gameday broadcast crew. ●

Jonathon's got a playground to conquer.



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St. Jude patient Jonathon:
Playground King

But at this moment, he's fighting cancer.

That's why St. Jude Children's Research Hospital® spends every moment changing the way the world treats children – with pioneering research and exceptional care. And no family ever pays St. Jude for anything. Don't wait. Join St. Jude in finding cures and saving children like Jonathon. Because at this moment, he should be headed down the tallest playground slide into his mom's arms.

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During a tour of St. Jude, platinum-selling recording artist Jordin Sparks visits with Alyssa Babineaux. Sparks also performed for patients and their families at an exclusive concert presented by ALSAC corporate partner Target in celebration of the hospital's and Target's 50th anniversaries.



Finding cures. Saving children.