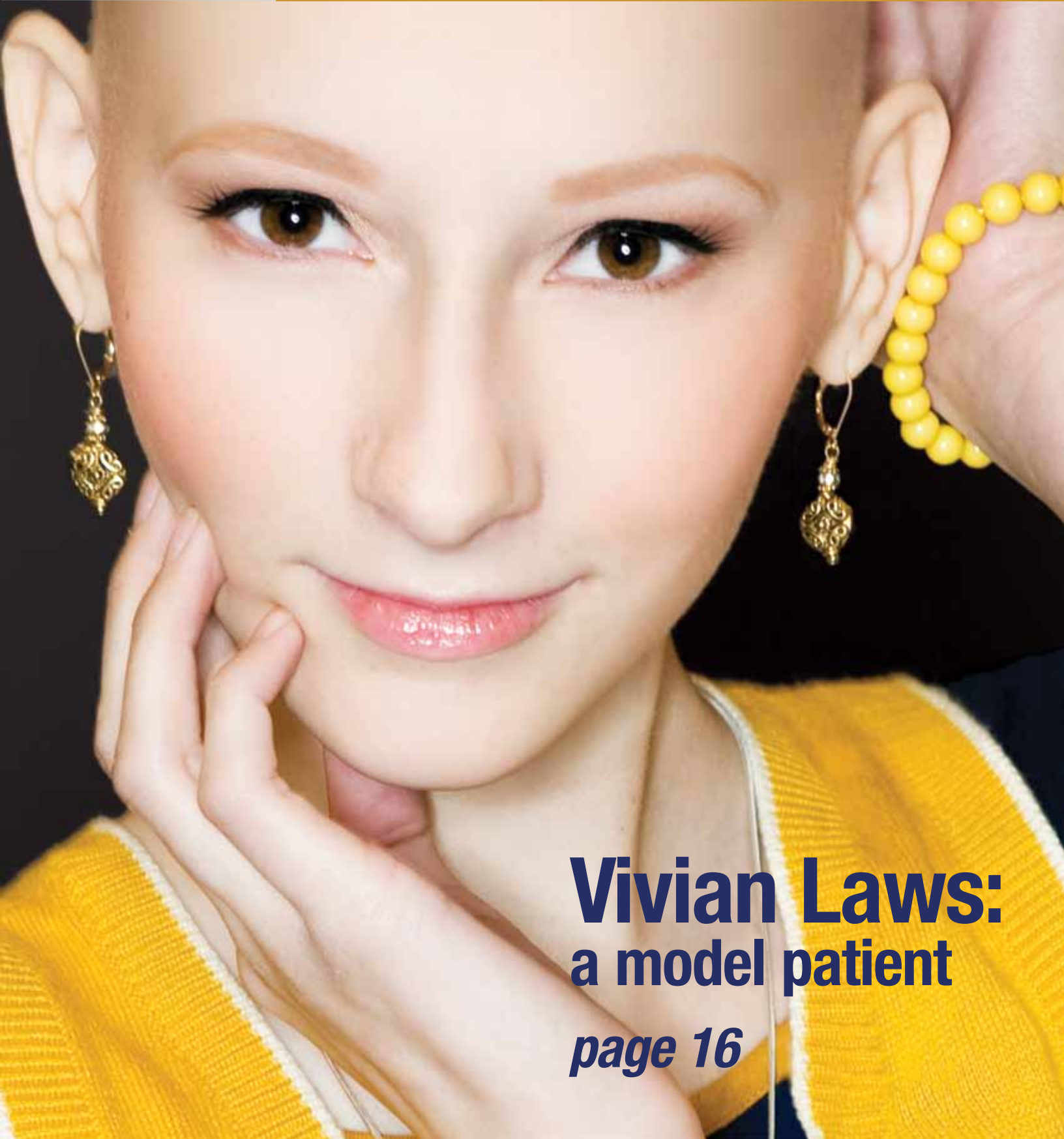


Promise

SPRING 2009



Vivian Laws:
a model patient

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Cover story

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An aspiring model lives her dream.

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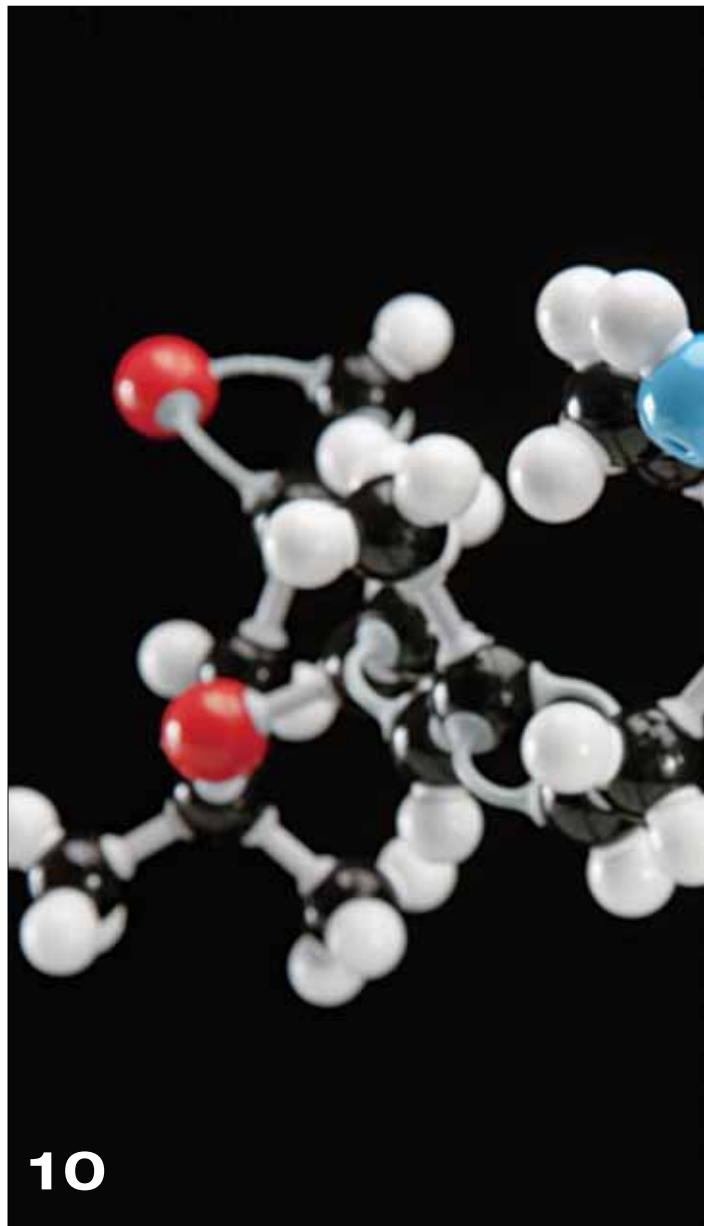
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Promise

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Highlights



Gene mutations predict leukemia relapse

Scientists have identified mutations in a gene that predict a high likelihood of relapse in children with acute lymphoblastic leukemia (ALL). The findings may provide the basis for future diagnostic tests to assess the risk of treatment failure.

Although cure rates for ALL exceed 80 percent, only 30 percent of children who experience a relapse will survive five years. Until now there has been no good marker for predicting relapse risk so that physicians could tailor treatment intensity appropriately.

Investigators analyzed the DNA of leukemia cells obtained from children to see if specific genetic changes predicted

relapse. “Based on our findings, we identified a group of genetic abnormalities that together predicted poor outcome,” said Charles Mullighan, MD, PhD, of St. Jude Pathology. Mullighan was first author of a report on this study, which appeared in the January 2009 *New England Journal of Medicine*.

The most significant association was with deletions or changes in the *IKAROS* gene. Children with *IKAROS* mutations had a high risk of relapse. The researchers also tested whether the presence of *IKAROS* alterations was associated with levels of minimal residual disease, a term used to describe

small numbers of malignant cells that remain in the patient after therapy.

“An important analysis we conducted was to see whether identifying the association of *IKAROS* alterations with poor outcome added anything to just measuring levels of minimal residual disease,” said James Downing, MD, St. Jude scientific director and the paper’s senior author. “And, indeed, it did.”

The findings suggest that identifying *IKAROS* alterations may be clinically useful and will complement existing diagnostic tests and measurement of minimal residual disease levels.

Researchers discover how gene defects trigger diseases

St. Jude scientists have teased apart the biological details distinguishing two related neurological diseases—ataxia telangiectasia-like disease (ATLD) and Nijmegen breakage syndrome (NBS).

Both disorders arise from defects in a central component of the cell’s machinery that repairs damaged DNA, but the resulting diseases are drastically different. Defects in DNA repair dramatically increase the risk of cancer, which is found in NBS. That disease is also characterized by the occurrence of small brain size, while ATLD predominantly causes neurodegeneration.

St. Jude investigators analyzed how gene defects give rise to the different diseases. The researchers published their findings in *Genes & Development* in January 2009.

“Besides shedding light on the rare diseases, the findings may also help to understand how defective DNA repair can selectively affect different organs and how this leads to cancer in some situations,” said the paper’s senior author, Peter McKinnon, PhD, of St. Jude Genetics and Tumor Cell Biology.





More cancer survivors need breast cancer screening

Women who received chest radiation during childhood cancer treatment suffer a high risk of breast cancer; yet, they are far less likely to begin recommended early mammogram screening than they should, researchers discovered in the first-ever survey of such at-risk women.

During the last decade, the Childhood Cancer Survivor Study (CCSS), a consortium of 26 centers led by a research team at St. Jude, has found that these women constitute one of the highest risk populations for breast cancer.

“Their risk is even higher than that of women with mutations in the cancer genes *BRCA1* and *BRCA2*,” said Les Robison, PhD, St. Jude Epidemiology and Cancer Control chair. “Thus, it is currently recommended that these women begin screening for breast cancer at age 25.” By catching the disease at an early stage, successful treatment is far more likely.

Robison was senior author of a report on this study, which appeared in the January 2009 *Journal of the American Medical Association*.

To discover whether such at-risk women were having early screening, the researchers surveyed 551 female CCSS participants between the ages of 25 and 50. Of women ages 25 to 39, only 36.5 percent reported having mammograms in the previous two years. Nearly half of the women under 40 had never undergone a mammogram.

Besides continuing to monitor the mammogram frequency among the at-risk women, the CCSS will begin to develop educational programs for these women and their health care providers. “We hope that these programs could ultimately bring the screening rate of this at-risk population to 100 percent,” Robison said.



ANN-MARGARET HEDGES

From patient to physician

Former St. Jude patient Gustavo Furas of Uruguay (at right) talks with surgeon Bhaskar Rao, MD, during Furas' recent visit to the hospital. Furas first came to St. Jude at age 15 to obtain treatment for an aggressive, soft-tissue tumor called rhabdomyosarcoma. He returned to Memphis in February 2009 as a medical student participating in the hospital's International Visitor Education Program.

Furas says he has enjoyed working with clinicians who once treated him—such as Rao, who performed two operations on Furas. “It’s pretty amazing to come back here on the other side,” says Furas, who shares a special bond with the children he encounters. “I’ve been through many of the same things that these kids are going through,” he says.

After completing medical school, Furas hopes to work at St. Jude as a pediatric oncologist. “There’s no way I can return the favor of saving my life,” he says. “Anything I can do for St. Jude, I’m happy to do.”

Highlights

Researchers identify new subtype of T-ALL

St. Jude researchers have identified a subtype of acute T-lymphoblastic leukemia (T-ALL) that is resistant to standard chemotherapy. Clinicians plan to use this new insight to diagnose the disease in children and to use bone marrow transplantation to more effectively treat the disease.

T-ALL is a cancer of white blood cells called T cells. About a fifth of children with the disease succumb to it. The T-ALL subtype identified by St. Jude scientists arises from early T-cell precursors (ETPs). These cancerous T-cells are resistant to chemotherapy.

“Before our work, it had been known that there were different subtypes of T-ALL, with different cell markers and gene expression characteristics,” said the paper’s senior author, Dario Campana, MD, PhD, of St. Jude Oncology and Pathology departments. “But these classifications never gave us a strong enough prognostic indication to make a clinical decision on how to treat children with T-ALL.”

Campana and his colleagues published an article on this work in *The Lancet Oncology*, January 2009.

“New molecular insights are important to enable us to continue to increase the effectiveness of treatments.”



Scientists improve pneumonia treatment

St. Jude scientists have demonstrated an extremely effective treatment for bacterial pneumonia following influenza. The researchers found that the antibiotics clindamycin and azithromycin, which kill bacteria by inhibiting their protein synthesis, are more effective than a standard first-line treatment with the antibiotic ampicillin, which causes the bacteria to burst.

The finding is important because pneumonia is a principal cause of death from influenza in children and the elderly.

“Traditional, first-line therapy has been based on the belief that the bacteria are bad, so we have to get rid of them as quickly as possible,” said Jonathan McCullers, MD, of St. Jude Infectious Diseases. “But we found that we may need to worry about the inflammation first and the bacteria second. Our findings represent the first data showing that inflammation is important and that alternative therapies such as protein synthesis inhibitors should be considered and incorporated into revised guidelines.”

McCullers and his colleagues published their findings in the *Journal of Infectious Diseases*, February 2009.

Patched 1 targeted in brain tumor development

St. Jude scientists have generated new models of medulloblastoma tumors by inactivating different DNA repair pathways, specifically in the brain. Medulloblastoma accounts for about 20 percent of childhood brain tumors.

Many cancers can originate with the failure of the cell’s machinery for repairing broken DNA segments. Investigators found that in all medulloblastomas generated by the methods they used—inactivating DNA repair processes—a gene called *Patched 1* was inactivated, indicating that this gene plays an important role in the disease. Scientists hope to use this approach to understand other types of brain tumors and develop new treatments. Results of the study appeared in *Proceedings of the National Academy of Sciences*, January 2009.

“Although medulloblastoma is a particularly devastating brain tumor in children, there have been great advances in successful treatment strategies,” said the paper’s senior author, Peter McKinnon, PhD, of St. Jude Genetics and Tumor Cell Biology. “Nevertheless, the cure rate is still only about 70 percent, so any new molecular insights are important to enable us to continue to increase the effectiveness of treatments.”



Smoke Signals

St. Jude helps childhood cancer survivors say “no” to nicotine.

BY SUMMER FREEMAN

Former St. Jude patient Paul Wright knew he might one day encounter health problems as a result of his cancer or its treatment. Most of those long-term effects were out of his control. But, as an adult, Wright realized that he had the ability to abolish one habit that could dramatically affect his well-being. Now, with the aid of a new smoking cessation study, he is taking a step in the direction of better health.

Despite the known health risks, about 18 percent of childhood cancer survivors smoke—a rate that is nearly the same as that of the general population. But childhood cancer survivors are more likely to develop second cancers and other health conditions such as diabetes, heart

disease and stroke.

In recent years, smoking prevention and cessation efforts have included public smoking bans and the establishment of toll-free quit lines. But this approach did not address the unique needs of childhood cancer survivors. St. Jude Children’s Research Hospital established the Cancer Survivors Tobacco Quit Line so that counselors can speak directly to these smokers.

“The increase in survival rates for childhood cancer has been one of the most significant successes in cancer during the past three decades,” says Robert Klesges, PhD, of St. Jude Epidemiology and Cancer Control. “However, few researchers have addressed the issue of smoking in cancer survivors. Because the

population of childhood cancer survivors is growing each year, St. Jude sought an effective way to help these individuals.”

In the St. Jude study, participants are assigned to one of two interventions: a counselor-initiated group or a self-paced group. In the counselor-initiated group, St. Jude counselors call participants six times during an eight-week period. The counselors help participants prepare to quit, set quit dates and help participants avoid relapses. Smokers in the self-paced group receive the same intervention but are responsible for phoning the counselors. All participants receive nicotine-replacement therapy in the form of patches or gum.

“St. Jude has long sought to empower cancer survivors, helping them understand the health risks associated with their treatment as well as provide resources for follow-up care. The quit line is an extension of this philosophy,” Klesges says.

St. Jude counselors on the confidential, toll-free line hold advanced degrees and have professional experience in public health. “We personalize the plan to each participant,” says Charla Folsom, the study’s lead clinical research associate. “We gauge what situations are the hardest for participants and try to come up with a plan to help with those situations.”

Wright says the calls have been instrumental in his success. “I smoked for 20 years and wanted to quit for a while now,” he says. “The quit line has helped me to make that step. The calls from the counselors have been very helpful—providing a voice of encouragement and tips to move past the cravings.”

The study is open to all childhood cancer survivors, regardless of where they received treatment. Study organizers plan to enroll 1,000 participants during the next five years.

To learn more, call (877) 4SJ-QUIT, or visit www.stjude.org/breakfreefromsmoking. ●



The **BiG** Picture

How can we design more effective chemotherapy for childhood leukemia? St. Jude researchers look at the big picture—and find intriguing answers.

BY CARRIE L. STREHLAU

Genes. There are thousands of them in the human genome. Some determine eye color. Some determine height. Some increase the likelihood of cancer. Scientists have long understood that the cancer cell's genes play a major role in the outcome of cancer therapy. But St. Jude Children's Research Hospital scientists recently illustrated that other genetic factors can also contribute significantly to the outcome of therapy.

St. Jude researchers discovered in children with acute lymphoblastic leukemia (ALL) a host of inherited genetic variations that may help clinicians design more effective chemotherapy. The findings are crucial because individual patients can respond differently to the same drug.

"This study differs from most previous investigations of gene variations linked to chemotherapy outcome because those studies focused only on the genes of the leukemic cells themselves," says Mary Relling, PharmD, St. Jude Pharmaceutical Sciences chair. "We focused on variation that is inherited and affects all cells in the body, not just the leukemic cells."

Foresight rewarded

For more than 20 years, St. Jude has been saving samples of DNA from patients in anticipation of the day when technology would allow researchers to take a broad, genome-wide approach toward cancer treatment. Not that long ago, researchers could only study one gene at a time. But times have changed.

"Instead of looking at one gene," Relling says, "we can do a genome-wide interrogation of all 20,000 genes in the human genome."

Relling and her colleagues are especially interested in single nucleotide polymorphisms, or SNPs (pronounced *snips*). SNPs are DNA sequence variations that occur when a single DNA building block called a nucleotide in the genome sequence is altered. SNPs can predispose children to disease or influence their response to drugs. Using a high-tech tool known as a SNP chip, St. Jude scientists can now screen a million SNPs per patient.

In an effort to determine how inherited genetic variation affects children with ALL, St. Jude collaborated

“Instead of looking at one gene, we can do a genome-wide interrogation of all 20,000 genes in the human genome.”

with the Children’s Oncology Group (COG), the national network of hospitals treating childhood cancers. Relling and her colleagues obtained DNA from 487 children with newly diagnosed ALL who were treated on either St. Jude or COG clinical trials. The scientists studied the DNA making up genes inherited from the parents, in contrast to the DNA that originated from the patients’ tumor cells.

Researchers looked for SNPs that might predict why some children have a good response to the first few weeks of chemotherapy and others do not. Early response was measured by assessments of minimal residual disease (MRD), the small number of leukemic cells that survive after remission induction therapy. This measurement helps clinicians identify patients whose disease is highly responsive to chemotherapy and therefore might be cured with milder and less-toxic treatment, and which are more resistant and thus need more aggressive chemotherapy.

Then researchers searched for inherited SNPs. “Working with our statisticians, we found 102 SNPs out of 600,000 that were associated with eradication of MRD at the end of the induction phase in these children,” Relling says. “Of those 102, about 60 were also associated with related characteristics, such as relapse risk, drug exposure and very early response.”

The scientists studied the relationship between the SNPs and three measures of total body exposure to the medicines that St. Jude uses to treat childhood leukemia. If a patient clears the drugs quickly, the blood levels of the anti-leukemic drugs in these children will be low. A high percentage of the 102 SNPs associated with lower levels of MRD were also associated with slow drug clearance or higher levels of anti-leukemic drugs in the ALL cells.

“That makes a lot of intuitive sense,” Relling says. “Part of the way that inherited variation affects anti-leukemic response is by affecting the efficiency of gene products that metabolize and excrete medicines.”

Surprise candidate

The researchers discovered five SNPs that are located in and around a gene called *IL15*, which codes for a protein that stimulates multiplication of leukemic cells.

Other research has shown that this gene is related to drug responsiveness of blood cells.

“It makes sense that *IL15* could be related to whether the child’s leukemia cells respond well to therapy or not, but the findings are interesting because it would not have been anybody’s top candidate gene,” Relling says. “We have had our list of genes that we have been working on for the last 20 years, but those genes do not tend to be the ones that are the hits we get from these genome-wide surveys.”

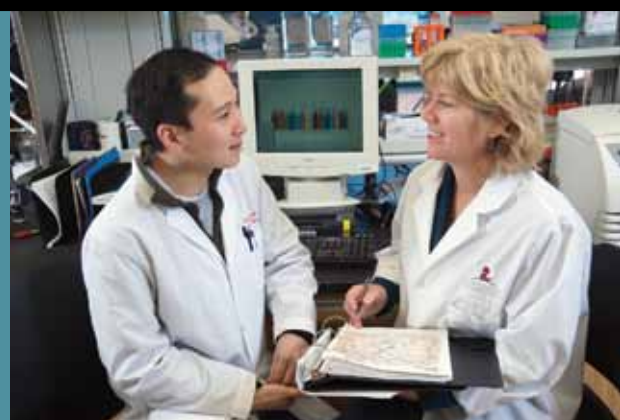
“It could be that *IL15* will be a good target for new anticancer drugs, or it will help us assign patients into risk groups, which are used to modify therapy based on those risks,” Relling says.

Some of the 102 SNPs probably work by directly affecting the responsiveness of the ALL cells. Just because it is inherited, that does not mean that genetic variation disappears in the leukemia cells that arise in the body. The leukemia cells that arise in a child are influenced by the genetic variants the patient inherited from the parents, as well as by genetic variants the patient acquired in the bone marrow cells that made the leukemia cell arise in the first place.

Relling, Yang and their colleagues published their findings in the *Journal of the American Medical Association* earlier this year. Based on the success of that project, St. Jude is collaborating with COG on several other genome-wide studies.

“Our results show the importance of surveying variations in the entire human genome in normal cells from patients, since many such variations can determine

Pharmaceutical Sciences Chair Mary Relling, PharmD (at right), collaborated with postdoctoral fellow Jun Yang, PhD, and other colleagues to better identify how inherited genetic variation affects children with acute lymphoblastic leukemia.



the effectiveness of chemotherapy,” says Jun Yang, PhD, a postdoctoral fellow in St. Jude Pharmaceutical Sciences. “In the future, such information might help clinicians use drugs more effectively to overcome the patient’s own genetic variation and reduce the chance of treatment failure.” ●

Coming to a TV Near You...

A Place of Hope chronicles the stories of six children as they receive treatment at St. Jude.

BY TARA MILLIGAN



Nyla Johnson and her mom appear with National Outreach Director Marlo Thomas in *A Place of Hope*, which is airing on stations nationwide.

“From the moment you walk through the doors of St. Jude Children’s Research Hospital, the feeling of hope surrounds you.”

With those words, spoken by St. Jude National Outreach Director Marlo Thomas, TV viewers across the country begin a journey of hope with six patients as they bravely battle cancer at St. Jude.

The hospital’s new TV special, *A Place of Hope*, recently began

airing around the country. The hourlong show, hosted by Thomas with special guest actress Jennifer Garner, follows the stories of Morgan, Daegen, Nyla, Stephan, Peter and Sam and their families. As the children’s journeys unfold, viewers learn about the groundbreaking treatments that make St. Jude one of the world’s premier pediatric cancer research centers.

During the show, several St. Jude Partners In Hope supporters explain why they have embraced the hospital’s mission of finding cures and saving children. Viewers are also invited to become Partners In Hope in the fight against the deadly diseases that threaten the lives of these children.

“When I’m at St. Jude, it is such a moving experience to see these precious children laughing and playing even as they are fighting for their lives,” Thomas says. “I know viewers will be inspired by their stories of hope and the mission of St. Jude to conquer the deadly diseases that steal children from their families.”

A Place of Hope airs in more than 100 markets. St. Jude friends can log onto www.aplaceofhope.org to find air times for the special on cable and their local TV stations. The

Web site also includes information about becoming a Partner In Hope, as well as updates on the patients featured in the show—patients like Samantha, an outgoing 9-year-old, who loved cheerleading and hanging out with her friends. But a painful bump on her leg began keeping Sam from her favorite activities. Then her family learned the devastating news: Sam had a tumor on a bone in her leg—an aggressive cancer called osteosarcoma.

Doctors immediately recommended that Sam and her mother travel to St. Jude. Sam agreed to go on one condition: She was only going to stay for 30 minutes. But once she arrived at St. Jude, Sam realized this was a different kind of hospital, with murals on the walls and activities and games to play. Sam underwent surgery to remove the tumor and part of the bone, followed by 42 weeks of chemotherapy to fight the cancer.

Throughout Sam’s treatment, viewers see her bravery, her strength and her determination to get back on her feet.

All of the children featured in *A Place of Hope* have dreams of life after cancer: to go to school, play and grow up like other children. Sadly, some dreams are cut short. One of the little heroes loses the battle. But viewers see how that experience only strengthens the resolve of the researchers and clinicians who are working to fulfill the dream of St. Jude founder Danny Thomas that “no child should die in the dawn of life.”●

Visit www.aplaceofhope.org to see when *A Place of Hope* will be broadcast in your area.

Completing the Circle

“The natural extension of gratitude is sharing of your time, talent and treasure,” says Doug Pattison. “From sharing, many things will flow back to you in a complete circle.”

BY JANICE HILL

Doug Pattison’s connection to St. Jude began before he was born. His mother prayed to the patron saint of hopeless causes while she was pregnant because she had undergone several earlier miscarriages and she worried that she could not have a successful pregnancy at the age of 41. When Loretta Pattison gave birth to a healthy boy, her fourth child, she was so thankful she named him Douglas Jude.

When she died at age 87, a statue of St. Jude was at her bedside.

Soon afterward, Doug and his wife, Ginger, looked for a fitting way to honor his late parents. Funding a parent room adjoining an inpatient room at St. Jude Children’s Research Hospital seemed the perfect choice, Doug says. A plaque outside the room now reads, “In joyful tribute and abundant gratitude to my loving parents, Lovell and Loretta Pattison. Douglas Jude Pattison.”

“It is a great place for their tribute to be—with the parents of a child who is facing a great challenge. It gives me tremendous joy in giving it,” Doug says. In fact, he and Ginger decided to fund two parent rooms, and are considering naming the second room for their own family.

Just as he made the gift in gratitude for his parents, Doug says he believes all giving springs from gratitude. “I don’t believe you can be a generous person if you’re not rooted in gratitude,” he says. “The natural extension of gratitude is sharing of your time, talent and

treasure, each according to the measure one has been blessed with. From sharing, many things will flow back to you in a complete circle. I know it has for me.”

Doug worked his way through college “by examining people’s fingerprints” at the FBI in Washington, DC. A subsequent accounting career took him to Oklahoma City and then to Chicago. Since 1993, he has served as chief financial officer for Harpo Productions Inc., which oversees the entertainment interests of talk show host, actress and producer Oprah Winfrey.

Throughout his career, Doug donated to causes close to his heart such as St. Jude, increasing his gifts as he became more successful.

“To whom much has been given, much is expected,” he says, “but I don’t see giving as an obligation. It’s a joy.

“I don’t think your life is about you,” he continues. “It’s about other people—the people you meet and the people you don’t meet; what you do for others and what you neglect to do for them. We are here to serve, not to be served.”

Doug says possessions are unimportant to him—with the exception of a medallion of St. Jude that Ginger gave him when their youngest son was born. It bears the names of his wife and two boys, now ages 14 and 17, and Doug wears it around his neck at all times.

Doug says he feels a close connection to the children and



Doug and Ginger Pattison give to St. Jude out of gratitude for what they have been given.

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“I don’t think your life is about you. It’s about other people.... We are here to serve, not to be served.”

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families at St. Jude, and he and Ginger look forward to the opportunity for their first visit there.

“While I’ve not actually met a child or parent who has gone to St. Jude, and I’ve never experienced their pain, I trust that I have been able to help,” he says. “And that’s what I want—to have an impact for the good. That’s a large part to what finding your purpose in life means.”●

Second Nature

BY ELIZABETH JANE WALKER

Inspired by toxins that occur in nature, St. Jude scientists create an entirely new class of drugs that attack cancer in a novel way.

Sometimes inspiration truly comes from above. (Remember Sir Isaac Newton and the apple?) A couple of years ago, falling debris caused much more than a mere bump on the head for another scientist. But the result was, as in Newton's case, a discovery of some gravity.

When ceiling repairs caused a powdery fungus to sift down onto his head, Thomas Webb, PhD, suffered a violent allergic reaction that resulted in a case of hives and a round of steroids. While he recovered, the researcher began to contemplate the natural toxins that had attacked his system with such vengeance.

"How can I direct that kind of effect against cancer?" pondered Webb, a faculty member in Chemical Biology and Therapeutics at St. Jude Children's Research Hospital.

Examining natural toxins from organisms such as fungi and bacteria, Webb soon noticed a set of structures that displayed extremely potent biological activity.

"There's something really special about these molecules," he told himself. "Nature's trying to tell me something. I just have to figure out what it is."

That's exactly what he did.

He and his colleagues set about designing a new type of anti-cancer drug based on a chemical that bacteria use to attack organisms they infect.

Simplify, simplify, simplify

Webb soon became enthralled by the structure of two kinds of natural products: One was a potent anti-cancer compound called FR901464; the other was a type of cancer cell inhibitor called a pladienolide (pronounced *play-die-EEN-o-lide*). Bacteria use the same mechanism in both of these products to cause harm to other organisms.

The compounds inhibit cancer cells by impeding the function of an enzyme complex called the spliceosome. If the spliceosome cannot fulfill its duties, cancer cells cannot replicate. Webb and his colleagues began creating FR901464 analogs that would prevent spliceosomes from doing their job—thus halting cancer growth.

Instead of using these compounds as they occur in nature, the St. Jude team opted to simplify the compounds' molecular structures to make them easier to synthesize in the laboratory. Webb and his team identified the molecules' critical features and began synthesizing new compounds that would be much more active against cancer than the original pladienolides were. Not only are the new molecules simple in structure, but they can also be assembled quickly from inexpensive and readily available chemicals.

"St. Jude clinicians are looking for better drugs. They can only do so much with the tools they have. Researchers at St. Jude can change the world by putting the right tools in the hands of the clinicians."

Collaboration for a cause

Webb attributes the project's success to an alliance among several talented St. Jude scientists. For instance, Chandraiah Lagiseti, PhD, of Chemical Biology and Therapeutics completed the compounds' chemical synthesis. Stephan Morris, MD, of the St. Jude Pathology and Oncology departments chose the tumor lines that should be screened so that the team could identify which kinds of cancer were most sensitive to the compounds. Alan Pourpak, PhD, a postdoctoral fellow in Pathology, conducted much of the screening and worked with the project's laboratory models. A report on their research subsequently appeared in the *Journal of Medicinal Chemistry*.

The compounds the team created have shown great promise against lung, colorectal, breast, prostate, ovarian and lymph node cancers. The scientists also discovered that one of the new compounds kills cancer cells without causing toxicity.

"After five days of treatment, the tumors go away," Webb says. "If you have given a sufficient dose, none of the tumors regrow. If this translates into treatment for kids, then it will be beautiful. You're not talking about agonizing months of treatment with conventional chemotherapy. You're talking about a relatively short period of treatment for certain tumors. Then the children would return home cured."

Webb says that this work could lead to an entirely

new class of drugs that attack cancer in a manner unlike any current anti-cancer treatments.

"This could be a real breakthrough area," he says. "St. Jude clinicians are looking for better drugs. They can only do so much with the tools they have. Researchers at St. Jude can change the world in a really positive way by putting the right tools in the hands of the clinicians and saving kids."

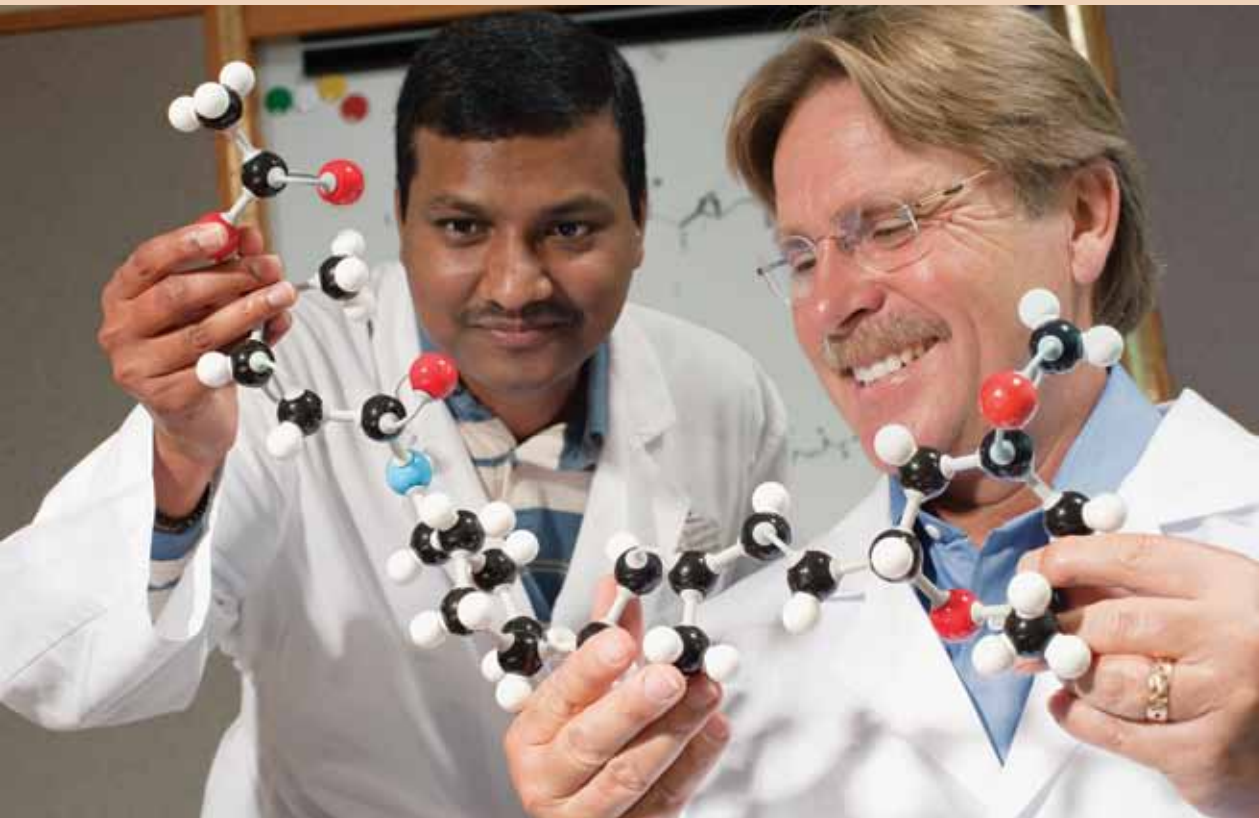
A win-win proposal

Webb dreams of the day when St. Jude might partner with a pharmaceutical company to develop one of the new compounds for adults as well as kids, using a strategy proposed by Webb's department chair, Kip Guy, PhD.

"Such a partnership would be a win-win for everyone," Guy predicts. "St. Jude could maintain all pediatric use of the compound and the pharmaceutical company could have all the adult applications."

A self-proclaimed optimist, Webb has high hopes for the research.

"I'm determined to develop new drugs that are going to save people's lives," he asserts. "Our research is going to save kids' lives, and when it comes to the point of making an arrangement with a pharmaceutical partner that will help us to develop it, it's also going to save adult lives. That's the kind of impact that I'm excited to make."●



SETH DIXON

Chandraiah Lagiseti, PhD (at left), and Thomas Webb, PhD, examine a model of a new type of anti-cancer drug based on a chemical that bacteria use to attack organisms they infect.



Beyond the Yellow Brick Road

One gray, winter day a cyclone picked up tiny Ellen Taylor and plopped her into an alien land. How could she muster the wisdom, the courage and the heart to travel the difficult road ahead?



BY ELIZABETH JANE WALKER

When 5-year-old Ellen Taylor sings “Somewhere Over the Rainbow,” children stop and gape. Women catch their breath. Grown men wipe away tears. Even the most cynical listener is transfixed as Ellen’s angelic voice describes a place of childhood dreams—a Technicolor landscape of innocence and hope and possibility.

A world where cancer has no dominion.

Gathering storm

Like Dorothy in *The Wizard of Oz*, Ellen led a routine life before the clouds rolled in during the fall of 2007. Her long journey began in November of that year, when Ann and J. Lee Taylor noticed bumps on the neck of their 3-year-old. The pediatrician calmly explained that swollen lymph nodes were common in young children. During the next three months, several physicians prescribed antibiotics in an effort to treat an assumed infection.

The nurse and Ellen held hands, closed their eyes and repeated, “There’s no place like home. There’s no place like home. There’s no place like home.”

By February 2008, Ellen had completed her third round of antibiotics. The knot above her ear had grown to the size of a golf ball, with a chain of smaller bumps extending down her neck to her collar bone. Exasperated and concerned, her parents demanded a more thorough exam. When a CT scan and X-ray were inconclusive, the Taylors took Ellen to a pediatric surgeon.

The surgeon took one look and told them, “It’s an infection; don’t worry.”

But—like the other doctors—the surgeon was wrong.

Eye of the cyclone

When a biopsy indicated that Ellen had cancer, J. Lee and Ann were stunned. “It was one of those things that you think happens to other people’s children,” says Ann, a registered nurse. “Something like that could never happen to us.”

Doctors immediately referred Ellen to St. Jude Children’s Research Hospital. As the family arrived at the hospital gate, a security officer recognized the shock and devastation on their faces. Filled with compassion, he placed his hand on J. Lee’s arm. “You’re in the right place,” the officer said, reassuringly.

“I think you’re right,” J. Lee responded.

At St. Jude, testing revealed that Ellen had non-Hodgkin lymphoma, a cancer that originates in the lymph system. The tumor’s size and its proximity to the brain—combined with the long interval between its appearance and the diagnosis—prompted Ellen’s treatment team to categorize the cancer as stage III.

Clinicians opted to treat her with a protocol designed for children with high-risk leukemia. “Leukemia and lymphoma are a spectrum of the same disease,” explains Raul Ribeiro, MD, of St. Jude Oncology. “Typically, lymphomas may be treated less aggressively, but Ellen had a really advanced stage of lymphoma, so we decided to treat her with a protocol that involves very intensive chemotherapy.”

Treatments developed at St. Jude have increased the overall survival rate of childhood non-Hodgkin lymphoma from 7 percent in 1962 to the current rate of 80 percent. But Ribeiro estimated Ellen’s rate as closer to 90 percent.

“From that moment on, we were able to breathe,” Ann says. “We weren’t able to relax, but we weren’t as afraid for her life. Dr. Ribeiro gave us hope. It was something to hold onto.”

Medals for courage

During her first week at St. Jude, Ellen was terrified of the alien world of tests, needles and scary medical equipment. She found refuge in the familiar songs, bright colors and magical plot of *The Wizard of Oz*. One evening, Ellen and her family were watching the scene in which the distraught Cowardly Lion wipes away tears with his tail. “Mama, I need one of those for when I go to St. Jude,” Ellen said, pointing at the lion’s tail.

Hearing the request, Ellen’s aunt immediately fashioned a lion’s tail for the little girl. “For several months, Ellen took the tail with her every time she went to St. Jude,” Ann says. “Then one day, she decided that she didn’t need it any more. She had courage without it.”

Ann and J. Lee attribute much of Ellen’s bravery to the compassionate care she receives at the hospital. During a particularly grueling segment of her treatment,



Accompanied by her physician, Raul Ribeiro, MD, Ellen proudly displays her Dorothy costume. “All the nurses and the doctors here are like family,” Ellen’s mom says. “That, for us, is the miracle of this place.”



After braving cancer treatment, Ellen is undaunted by the Wicked Witch of the West, winged monkeys or public performances. She has become adept at the latter, singing at several St. Jude fundraisers.

Ellen had to receive one of her chemotherapy drugs as an injection.

“She would start crying as soon as she saw the nurses put on their blue chemotherapy gowns, because that meant the shot was coming,” Ann recalls.

Then Darlene Hawkins, RN, found a way to alleviate Ellen’s distress. She and Ellen held hands, closed their eyes, and repeated, “There’s no place like home. There’s no place like home. There’s no place like home.” The experience calmed Ellen like nothing else could do.

“Ellen would start looking for Miss Darlene every time she knew a shot was coming,” Ann says. “I didn’t ask Darlene to do that, and Ellen didn’t ask for that. Darlene just did it, and that makes all the difference. Miracles happen here. People like Darlene happen here—the little miracles within the big miracles.

“Doctors, nurses, nurse practitioners, pharmacists, care assistants, Child Life specialists, chaplains, volunteers, dietary staff, housekeepers—they all have a special gift for making a difference in the lives of children,” Ann continues. “It never fails to amaze me how freely they do that for their patients.”

Grateful hearts

During the past year, Ellen has received numerous chemotherapy drugs. Several times, her blood counts have fallen so low that chemotherapy has had to be postponed until her body could recover sufficiently. She is now about a third of the way through her treatment.

J. Lee and Ann say that they are overwhelmed at the care their daughter has received.

“They don’t hesitate to do what they need to for Ellen,” Ann says.

For instance, when Ellen was receiving high-dose methotrexate, her system failed to clear the drug, causing a toxic buildup in her body. John Sandlund, MD, of St. Jude Oncology told the Taylors that the hospital had a special drug available that could alleviate the problem. Thanks to this “antidote,” the threat was averted. Later, Ann discovered through a pharmacist in her hometown that one dose of that drug was extremely expensive.

“There was never a mention of cost; it simply was not a factor,” Ann says. “When Ellen needed the drug, St. Jude didn’t hesitate to use it.”

Ellen’s mom and dad know that kind of care can occur only through the generosity of donors. “Their money contributes to the work of God,” Ann says. “From the bottom of our hearts, we offer our deepest gratitude to donors for giving our family a chance.”

In the Taylors’ online journal, J. Lee echoes that sentiment, closing nearly every entry with a simple, heartfelt prayer: “Thank God for St. Jude.”

Daring to dream

After braving cancer treatment, Ellen is undaunted by the Wicked Witch of the West, winged monkeys or public performances. She has become quite adept at the latter, singing at many sporting events and St. Jude fundraisers.

“She sang the national anthem at an event when she was 3 years old,” Ann says. “People went nuts. That’s when she learned how good it feels to receive a standing ovation. She just loves it.”

Ellen’s mom taught her the words to “The Star Spangled Banner.” Her dad taught her the lyrics to Aerosmith songs. But her favorite tune remains “Somewhere Over the Rainbow.” Small hands clasping the microphone, Ellen belts out the song with a kind of fierce serenity:

*Somewhere over the rainbow
Skies are blue,
And the dreams that you dare to dream
Really do come true.*

The song seems to resonate with her parents, too. “Thanks to St. Jude,” Ann says, “we still have all the dreams and aspirations that we had for Ellen before her diagnosis.” ●

A Model Patient

BY BETSY TAYLOR

In the midst of cancer treatment, aspiring model **Vivian Laws** receives the surprise of a lifetime.



Vivian Laws' modeling goals were put on hold when the teen discovered she had osteosarcoma, a type of bone cancer. But a *TODAY* show producer helped Vivian realize one of her dreams by arranging a surprise appearance on the *Tyra Banks Show*. All smiles, Vivian (center) is flanked by Marlo Thomas and Tyra Banks on the set of the show.

Like many 12-year-old girls, Vivian Laws dreamed of having her name up in lights. By October of 2007, she was closer to her dream than most. She had a photo portfolio and a contract with a modeling agency. She acted in plays. Everyone seemed to know her name.

A cheerleader, Vivian served as base for the pyramids, holding the other girls steady as they climbed atop. Then one day, her right leg began to hurt. What doctors discovered inside her bone made Vivian's world come crumbling down. She had osteosarcoma, a type of bone cancer.

Fashioning a surprise

Vivian rebuilt her world thanks to her own perseverance and the excellent treatment provided by



Vivian puts finishing touches on her outfit before going onstage at the *Tyra Banks Show*.

St. Jude Children's Research Hospital. Her state-of-the-art surgery was a limb-sparing procedure, where the portion of bone containing tumor was removed and replaced with a metal rod. Vivian worked with her St. Jude physical therapist for more than a year to regain strength after surgery and chemotherapy.

Along the way, Vivian participated in St. Jude fundraising, helping the hospital by using her natural gifts. She spoke to visitors about her experience and modeled for St. Jude marketing photos.

In the fall of 2008, a *TODAY* show producer met Vivian as she prepared a St. Jude segment for the program. When the producer discovered that Vivian dreamed of being a model, she helped cook up

a surprise: Vivian would believe she was flying to New York for a *TODAY* show shoot, but instead she would be a special guest on the *Tyra Banks Show*.

Lights, cameras, astonishment

The surprise worked. When model and entertainer Tyra Banks burst into the dressing room with cameras in tow, Vivian's jaw dropped.

"I was completely shocked," Vivian says. "It probably showed on my face. I thought she was really pretty. I knew she was tall, but I thought, 'Gosh, she's really tall.'"

She looks up to Banks in another sense, as well—as a role model.

"Tyra is already a household name, but she still wanted to make other girls' dreams come true," Vivian says. "I think that's a really unselfish thing for her to do. On her talk

show, she focuses on teens and empowering girls."

After Vivian recovered from the shock of meeting her idol, she showed Banks her scrapbook, which documents her fight with cancer. Then Vivian sat for a photo session before the live studio audience.

Banks and Vivian were joined by Marlo Thomas, St. Jude national outreach director and daughter of hospital founder Danny Thomas. The women discussed St. Jude and the *Thanks and Giving* fundraising campaign, which encourages shoppers to "give thanks for the healthy kids in your life, and give to those who are not." Many leading brands and some of the most respected companies in the country partner with St. Jude for the campaign, and Vivian had the

opportunity to tell millions of viewers all about it.

Vivian appreciated Thomas' presence on the show.

"With Marlo being there, it kind of made it official," Vivian says. "Everything that I was doing was helping St. Jude. I knew that Marlo could get the word out even better than I could. And besides, she's really cool."

A model role model

It's important to Vivian to raise awareness of St. Jude with every appearance she makes on behalf of the hospital. She admits that before undergoing cancer treatment, she knew nothing about St. Jude.

Banks opened the eyes of her national audience to Vivian's beauty, saying that Vivian "rocked a clean head."

Afterward, viewers posted inspirational messages to Vivian via the TV show's Web site.

"It may sound corny, but whenever I'm really sad, I just go back and look at the posts," Vivian says. "It makes me feel better, whatever the situation might be—especially when there's a 13- or 14- or 15-year-old girl on there saying, 'I want to say that you're my hero and you've inspired me.'"

This inspiration is important because Vivian's fight is not finished. Although she has completed her chemotherapy and scans show no evidence of disease, Vivian will soon endure a third surgery on her leg. Her physician estimates it will take six weeks for her to walk without crutches, but Vivian bets she may walk sooner.

"I see it this way: 'How bad do I want to walk?' I don't think there's really a time limit," Vivian says.

The desire to model motivates her. She says she prefers to do her catwalk turns without crutches. She wants to show the world what she can do. ●

Sickle Cell Success

St. Jude scientists have developed a gene therapy technique that allows them to cure sickle cell disease in the lab.

BY JOYCE M. WEBB

After more than a decade of attempting to overcome the effects of a single, mutated gene important for red blood cells, scientists at St. Jude Children's Research Hospital have cured sickle cell disease in laboratory studies, moving closer to eliminating a lifetime of medications and blood transfusions for patients who suffer from strokes and other severe complications of the disease.

Gene therapy expert Derek Persons, MD, PhD, of St. Jude Hematology and his laboratory team cured a similar blood disorder called beta-thalassemia in the laboratory five years ago. The team's most recent experiments focused on trying to reverse the effects of sickling red cells in the blood and bone marrow.

"The idea is to use the patients' own stem cells, insert a gene that will overcome the sickle mutation and then reintroduce the cells back into the patient," Persons says. "By using the patient's own cells, you eliminate complications of transplanting another person's stem cells, such as graft-versus-host disease, rejection and other possible side effects."

The hemoglobin switch

Before birth, the body naturally produces alpha globin and gamma globin—two components found inside red blood cells that combine to form hemoglobin. Hemoglobin carries oxygen from the lungs to all the tissues in the body. Six months after birth, the gamma globin gene, or fetal hemoglobin, tapers off and the beta globin gene switches on to produce adult hemoglobin. This biological change is known as the hemoglobin switch and is necessary for red blood cells to distribute oxygen throughout the body.

"Patients with sickle cell disease are perfectly fine when they're still inside the mother's womb," Persons says. "That's because the mutated or sickle beta globin gene is turned off. When the gene is turned on, that's when the disease becomes manifest."

The once flexible, round red blood cells become rigid and rod-shaped, making it difficult for them to squeeze through tiny blood vessels. This creates a traffic jam in the delivery route and leads to acute pain. In the St. Jude Sickle Cell Center, clinicians treat moderate-to-severe forms of the disease with lifetime maintenance therapies such as hydroxyurea and blood transfusions. Bone marrow transplantation is the only cure for sickle cell disease, but the procedure has risks and few children have matched donors.

Hope through gene therapy

Persons' laboratory—one of five basic science laboratories at St. Jude dedicated to the study of sickle cell disease and other blood disorders—is a shining example of the hospital's focus on translating discoveries in the laboratory into improved therapies for patients in the clinic.

He and his colleagues have known that high levels of fetal hemoglobin could reverse the effects of sickle cell disease, but scientists needed to mimic the disease's clinical symptoms in the laboratory to determine the best conditions in which to permanently repair defective cells.

Tamara Pestina, PhD, of St. Jude Hematology, isolated stem cells in a culture dish and exposed them to a vector carrying the gamma-globin gene, which can form fetal hemoglobin. This vector is a harmless virus that carries the gene into the DNA of the blood stem cell. The genetically modified stem cells are then infused; they travel to the bone marrow where new blood-forming cells are generated.

After months of collecting and analyzing the data, it was time to see if the transfer sufficiently blocked sickling in red blood cells.

"Our study indicated a high level of gene transfer," Pestina says. "We also found that the high levels of fetal hemoglobin expression significantly improved the anemia, renal function, spleen size and other symptoms of sickle



Derek Persons, MD, PhD (front), Tamara Pestina, PhD, and Phillip Hargrove of Hematology study the results of an experiment to determine whether the gamma-globin gene correctly inserted into the sickle cell blood stem cell. They found that insertion of a properly functioning gamma-globin gene, which led to production of fetal hemoglobin, reversed the effects of sickle cell disease in a laboratory study.

cell disease. We have a great team in place, and if this experiment translates into long-term success for children, it will be a big reward for everyone—for our lab, for St. Jude and for our patients.”

The ultimate reward

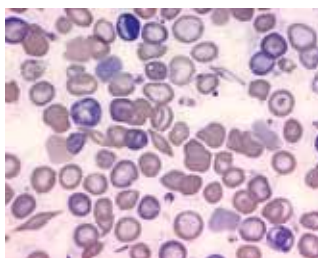
Although the latest experiment provides the highest level of cure for the disease, Persons says he and his research team will continue to refine the experiment to address safety and technical barriers.

“There are still some things we don’t understand about adult blood stem cells and the defense mechanisms that prevent their DNA from taking up new DNA. It’s like having a well-formed army camped around the city. These cells are not willing to let anything in because they have to protect themselves in order to last a long time.”

Persons applauds the support of St. Jude donors in making it possible to continue this research until the treatment is available for use in children. Persons and his team believe that this approach to gene therapy could ultimately improve the quality of life for the more than 70,000 Americans who live with sickle cell disease.

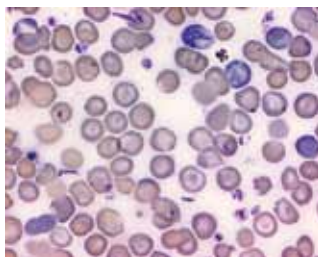
“These experiments are expensive and cannot be

done without the generous support we receive from our donors,” Persons says. “Their contributions allow St. Jude scientists to go beyond standard therapies and investigate novel approaches to treatment that actually turn out to be very valuable to our patients.” ●



The images at left illustrate the success of the St. Jude study.


In the top image, rod-shaped sickle cells are interspersed amid healthy red blood cells, which are round and soft.



The bottom image shows the absence of sickle cells after treatment with gene therapy.

A Class of His Own

BY MIKE O'KELLY



Mischievous Jonah Borngrebe is one of a kind. Unfortunately, the tumor in his brain is also extremely rare. St. Jude researchers are helping the world's scientific community better classify this tumor.

Kris Borngrebe fought back tears as she sat in a Nebraska hospital recovering from the whirlwind her family of six had just endured and unsure whether her 2-year-old son, Jonah, would survive another day. Her husband, Kurt, sat next to her, gently encouraging her to eat lunch, when he had a sudden realization that formed into a troubling question: “Did they *really* say brain cancer?”

Those surreal words echo through the young couple's thoughts

nine months later as they watch Jonah frolic on playground equipment at the Memphis Grizzlies House, an on-site housing facility at St. Jude Children's Research Hospital. Jonah is the Borngrebes' second youngest child—described by Kris as the agitator in the washing machine, who has a loving nature but makes a calm day exciting. He's quirky, mischievous and a non-conformist.

Jonah is now 3 years old and a veteran of two operations, multiple rounds of chemotherapy and countless visits to St. Jude. Scientists at

St. Jude have an intense interest in the remaining tumor cells, which weave through the left half of Jonah's brain.

A day to forget

One morning in May of 2008, Kris had just finished putting away the family's laundry when she discovered a normally healthy Jonah drooling as he sat on the floor next to his older brother, Aidan. Jonah shot Kris a glazed look as his head twitched back and forth.

Unable to locate the phone, Kris



At the hospital, results of a CT scan revealed a brain tumor. As Kurt entered the hospital room, Kris broke the news to him.

“Kurt and Jonah have a really special bond. Jonah is the only daddy’s boy we have of the four kids. It was hard telling my husband that Jonah had a tumor,” Kris says.

Jonah was transported to another hospital, where a neurosurgeon informed the Borngrebes that an MRI would be performed and that brain surgery was a possibility.

The couple contacted their priest, who administered the last rites to their son.

A baffling diagnosis

The news worsened as the MRI revealed the tumor was larger than first expected—the size of a softball instead of a golf ball. Nevertheless, Kurt and Kris remained optimistic as a strong group of family and church members gathered to offer support during the six-hour operation. Most of the tumor was removed; less than

a week later, Jonah walked out of the hospital with his family.

“He was walking and talking and fully functional,” Kris says. “He was even potty trained, which he wasn’t before.”

Pathology results revealed what physicians assumed to be a type of benign tumor. The Borngrebes believed they had dodged the worst, but a month later a postoperative MRI revealed that the tumor was growing back.

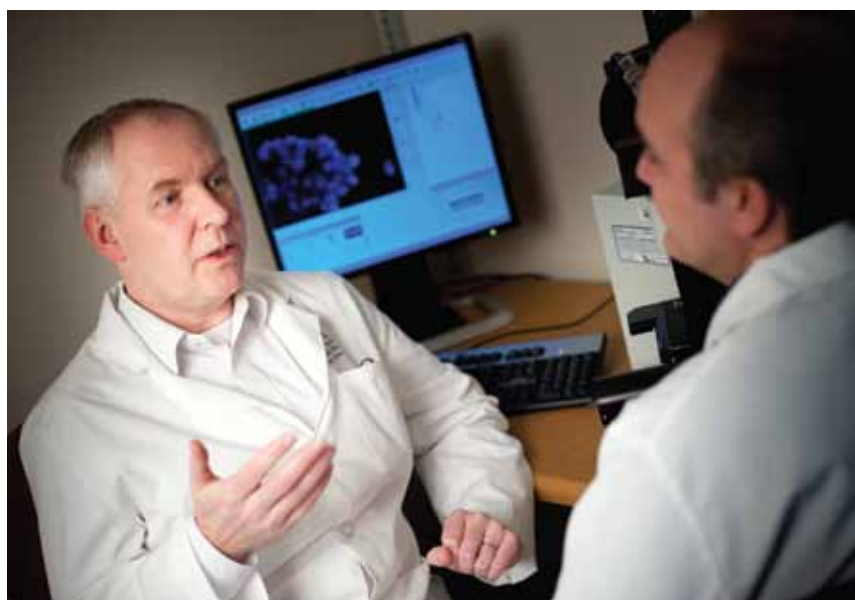
Physicians, somewhat baffled by the cancer, offered the Borngrebes a chemotherapy protocol that was not tailored to Jonah’s disease. Troubled, the Borngrebes searched for other options.

Researchers and physicians at St. Jude learned of Jonah’s case when Jonah’s physician referred him to St. Jude oncologist Alberto Broniscer, MD, an expert in high-grade gliomas. Broniscer asked St. Jude Pathology Chair David Ellison, MD, PhD, to review the tumor slides.

Ellison thought the tumor had

hoisted Jonah onto her shoulder and frantically ran to a neighbor’s house to call an ambulance. “It was like a bad after-school special,” Kris says. “I was screaming in my neighbor’s driveway, Jonah was convulsing in my arms, my two other little boys were watching from across the street, and the phone died while I was talking to 911.”

Within minutes, Kris and Jonah were in an ambulance speeding to the hospital, as Kris repeatedly called Kurt, who had turned off his cell phone while attending daily Mass.



St. Jude Pathology Chair David Ellison, MD, PhD, classified Jonah’s tumor as a malignant glioneuronal tumor, grade IV. Ellison and his colleagues are working to create more detailed classifications for this tumor type. The World Health Organization has yet to recognize malignant glioneuronal tumor as a distinct entity.

been misidentified. Under the microscope, it showed the pathological characteristics of the extremely rare malignant glioneuronal brain tumor. Even though physicians in Jonah's home state refused to operate again, St. Jude neurosurgeon Frederick Boop, MD, believed a second operation was possible.

A new tumor classification

The World Health Organization (WHO) categorizes brain tumors based on a combination of their microscopic pathological characteristics, knowledge of their biological behavior and occasionally by their genetic abnormalities. Brain tumor classifications have been based around the presumed cell of origin—either nerve cells, which are called neurons; or glial cells, which provide structural and nutritional support for neurons.

When viewed under a microscope, a few tumors show characteristics that combine the features of neuronal and glial cells. Jonah's tumor was one of these. Because it displayed higher grade features in some areas, Ellison classified it as a malignant glioneuronal tumor, grade IV.

Although the scientific literature acknowledges the existence of tumors like Jonah's, the WHO has yet to recognize the malignant glioneuronal tumor as a distinct entity. Ellison and Broniscer are working together to assess tumors that fall into this broad category. The colleagues have identified a range of glioneuronal tumor types, which they are currently studying. As the scientists focus on the tumors' molecular genetic characteristics, they hope to create more detailed classifications.

"With advances in understanding cancer cell biology, we can begin to find out how best to classify these

"We've got the expertise here to do research and clinical studies on these unusual tumors. We are well positioned to solve the problems they present."



Under the watchful eye of his parents, Jonah climbs up the slide at the Memphis Grizzlies House.

unusual tumors, not just in terms of how they look down the microscope, but also in terms of the genetic abnormalities that are responsible for turning a normal cell into a cancer cell," Ellison says.

Ellison would like to see new editions of the WHO classification incorporate more information on the molecular abnormalities of tumors to help pathologists diagnose unusual entities like malignant glioneuronal

tumors, predict how they will behave and better understand how they will respond to therapy.

"This is the sort of situation where St. Jude really comes to the forefront," Ellison says. "We've got the expertise here to do research and clinical studies on these unusual tumors. We are well positioned to solve the problems they present."

Coming to St. Jude

Jonah's physician in Nebraska helped the Borngrebes make the decision to travel to Memphis.

"Our oncologist in Omaha told us if we stayed there, Jonah would get mediocre chemo that might or might not save his life or do any good, but that at St. Jude, he'd get the full court press," Kris says.

During this time of turmoil, Kris also faced two other life-altering situations. A week before leaving for St. Jude, she underwent a biopsy to determine whether a lump in her breast was cancerous. And on the day she left for Memphis, Kris discovered she was pregnant with the couple's fifth child.

"We always wanted a big family, and No. 5 was in the plans, just not right then," Kris says. "Jonah loves babies more than anything, and I thought, 'I bet this is the reason we are having this baby right now—this baby is going to give Jonah the will to survive.'"

Kris learned the lump in her breast was benign on the day Jonah underwent his second brain surgery. St. Jude neurosurgeon Frederick Boop removed a sizable portion of the tumor during the operation, but due to the nature of the tumor, a section of inoperable tumor still remained.

The entire Borngrebe family traveled to Memphis for the first six weeks of Jonah's treatment. Kris' parents drove their motor home and



“Our oncologist in Omaha told us if we stayed there, Jonah would get mediocre chemo that might or might not save his life or do any good, but that at St. Jude, he’d get the full court press,” says Jonah’s mom, Kris. During a break from his intensive chemotherapy regimen, the toddler converses with Lionel Chow, MD, of St. Jude Oncology.

stayed nearby so that they could help care for the children. Kurt visited for two days twice a month. The upheaval in her family began to wear on Kris. But other St. Jude parents and Kris’ extended family of faith helped her realize that Jonah was in the best place for treatment. Kurt’s mother also provided support by staying with Kris when possible.

“From that point on, I just saw everything through different eyes,” Kris says.

An untraditional protocol

Because Jonah was younger than 3 when he arrived at St. Jude, physicians approached his treatment differently than they would have if he had been older. Older children typically receive both chemotherapy and radiation therapy, but radiation is not administered to younger patients because of the associated side effects.

“The protocol Jonah is being treated with uses a combination of conventional chemotherapy and

newer agents of chemotherapy, which target his tumor specifically,” explains Lionel Chow, MD. He and Broniscer oversee Jonah’s therapy, which includes three phases: induction chemotherapy; consolidation chemotherapy; and anti-angiogenic therapy, which attacks the blood vessels that nourish the tumor.

Jonah’s induction chemotherapy consisted of four monthlong rounds of drugs designed to wipe out as much of the remaining tumor as possible. An MRI assessment after the first phase revealed that significant parts of the tumor had dissipated.

The second block of chemotherapy was not as intense but was still administered in high doses. During this phase, Jonah returned home, visiting St. Jude once a month for treatment. A second MRI revealed the tumor had not grown back, which allowed Jonah to begin the third and current round of chemotherapy—a pill that targets the blood vessels that sustain the tumor.

“We want to prevent any of the single tumor cells or clumps of tumor cells that are left from being able to grow back into a solid mass,” Chow says.

Jonah’s current round of chemotherapy lasts six months and his check-ups can be performed in Nebraska. He will return to St. Jude every three months for MRI scans.

The will to survive

Kris admits that Jonah is not the same child he was before his experience with brain cancer. Once anti-social, he now concentrates on

TV programs and asks questions about the programming. Before his treatment, Jonah would either fall asleep or jaunt off into another room to wreak havoc. He now loves spending time with his siblings and requests that Aidan hold his hand when Kris administers shots to boost his white blood cell count.

Jonah is also fascinated and excited about the arrival of the latest Borngrebe—asking his mother often if the baby is still in her stomach and if it will cry when it is delivered. Kris has agreed to let Jonah pray over the baby when it arrives because he was concerned it would be scared.

Kurt and Kris reflect on that first, crazy day of diagnosis and remember how hard the journey has been. But they take comfort in what they have—the small rituals of love that only a family can give.

“Hey, Jonah! Guess what?” they often ask their son.

“You love me,” he invariably responds.

“Yep, we do,” they say. ●

Perspective

BY YOLANDA ADAMS

From the Heart

"It's great to be able to give a little hope to the kids at St. Jude — to let them know that you care about them, that you're praying with them. That's a part of the gift of life."

I've known about St. Jude for many years, but the importance of its mission was really brought home to me about three years ago, when my mom was diagnosed with cancer. I became passionate about finding answers to questions that I had, as I tried to get her to a cancer research center and obtain help for her. Having gone through that experience, I understand the highs and the lows that families go through—the ups and downs, the days of uncertainty.

The blessing of good health is something that my family no longer takes for granted. As an entertainer—and as the mother of an 8-year-old daughter—I have a responsibility to help people outside of my family and to be an example for others.

When I visited St. Jude a couple of years ago, I had the opportunity to talk with scientists and to obtain a bird's-eye view of what goes on at the hospital. I also got a chance to meet a lot of the beautiful children there—really, really sweet kids who remain in my heart to this day. So St. Jude will definitely be a part of my life from now on.

Last year, Radio One Networks partnered with the hospital in a radiothon that was broadcast through *The Yolanda Adams Morning Show*. It was phenomenal. We raised a million dollars in one day! That was cool. We were so excited to become a part of the St. Jude family.

As I told our listeners during the radiothon, helping these kids is definitely the right thing to do. It doesn't take much—the price of three cups of Starbucks coffee—to make a difference. Even in this economy, don't allow something that small to stop you from being a blessing to someone.

It's great to be able to give a little hope to the kids at St. Jude—to let them know that you care about them, that you're praying with them. That's a part of the gift of life.

Kids are innocent, and they come to St. Jude wanting to be the best that they can be. I used to be a second- and



PETER BARTA

"By helping St. Jude, you're sowing seeds into good ground," says entertainer Yolanda Adams, shown here with St. Jude patient DJ Franklin. "You're helping people who may never, ever get a chance to see you—but they'll always thank you."

third-grade school teacher, so I know how it feels to see kids come in, wanting to do their best, but not feeling their best. I understand that whole dynamic. We have to find a way to make children's lives better. And St. Jude does that.

By helping St. Jude, you're sowing seeds into good ground. You're helping people who may never, ever get a chance to see you—but they'll always thank you. It's definitely the right thing to do. ●

During her career in contemporary gospel and inspirational music, Yolanda Adams has been a vocal advocate for children. She is the recipient of four Grammy Awards, four Dove Awards, an American Music Award and seven NAACP Image Awards. Adams can be heard daily nationwide on The Yolanda Adams Morning Show.



Brook, 2 – ATRT (brain tumor)

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CHANGE SERVICE REQUESTED



CRNA for a day

By offering fun, hands-on activities, St. Jude clinicians help lower children's anxieties about otherwise mysterious procedures. St. Jude patients had the opportunity to learn a little about anesthesia during an educational event in February. From left, 7-year-old Hailey Runyon delivers anesthesia to a doll with the guidance of Deborah Flettrich, a certified registered nurse anesthetist (CRNA), and Krista Gray, a student training to be a CRNA. "Patients who participate in activities like this better understand what happens when they receive anesthesia," said Jack Shearer, CRNA, St. Jude chief nurse anesthetist. "They realize that a CRNA is by their side monitoring their vital signs and adjusting their anesthetics during the entire time they are asleep."

ANN-MARGARET HEDGES

Finding cures. Saving children.