New autism discovery could help explain key symptom of disorder

By Erin Digitale

In autism, brain regions tailored to respond to voices are poorly connected to reward-processing circuits, according to a new study by scientists at the School of Medicine.

“The human voice is a very important sound; it not only conveys meaning but also provides critical emotional information to a child,” said Vinod Menon, PhD, senior author of the study, published online June 17 in Proceedings of the National Academy of Sciences. Menon is a professor of psychiatry and behavioral sciences at Stanford and a member of the Child Health Research Institute at Lucile Packard Children’s Hospital.

“Under a white tent on the Alumni Lawn, in front of the Li Ka Shing Center for Learning and Knowledge, a crowd of about 1,500 family members, friends and colleagues gathered for the awarding of diplomas to the class of 2013. The graduates, in caps and gowns, sat on a stage. The graduating class totaled 225: 95 earned MDs, 91 earned PhDs or MD/PhDs, and 39 earned master’s degrees.”

By Tracie White

Finding your passion is key to success, Brian Kobilka, MD, said in a speech June 15 at the School of Medicine commencement.

“In his usual self-deprecating manner, the Stanford scientist, who was awarded the Nobel Prize in chemistry last year, minimized his credentials and credited support from others for much of his success.”

“I believe my career to date is an example of how a relatively average individual can achieve a measure of success through a combination of factors that include hard work, persistence, an element of luck and a great deal of help from family, friends and colleagues,” said Kobilka, professor and chair of molecular and cellular physiology.

Under a white tent on the Alumni Lawn, in front of the Li Ka Shing Center for Learning and Knowledge, a crowd of about 1,500 family members, friends and colleagues gathered for the awarding of diplomas to the class of 2013. The graduates, in caps and gowns, sat on a stage.

The graduating class totaled 225: 95 earned MDs, 91 earned PhDs or MD/PhDs, and 39 earned master’s degrees.

Lloyd Minor, MD, dean of the medical school, gave the opening remarks, urging graduates not to be afraid to take chances and reach for new shores as they begin careers as researchers and physicians.

School of Medicine graduates Michael Ahdoot, Shushmita Ahmed, Shah Ali, Greg Allen and Yi An wait for commencement to begin on Saturday, June 15.

By Krista Conger

Women with a family history of breast cancer, or with breast cancer themselves, are likely cheering the June 12 ruling by the U.S. Supreme Court, which found that patents granted to Myriad Genetics Inc. for the “breast cancer genes” BRCA1 and BRCA2 are invalid.

As a result, several other companies immediately began to offer analysis of the genes, which significantly increase a person’s risk for breast and ovarian cancer, at a much lower price than the $3,800 to $4,000 charged by Myriad.

Clinicians and researchers are also hopeful, if a bit more cautious. Although the ruling may be an ethical and philosophical triumph for those who believe that human genetic information should not be claimed by any corporate entity for profit, it’s not likely that patient care will change immediately, according to breast cancer clinicians at the Stanford Cancer Institute. Myriad’s experience in the field of BRCA gene testing and interpretation will be difficult to surpass, at least for a while, they said. Over time, however, the ruling should result in a freer research atmosphere that will translate into improvements for patients.

“This is a good thing for patients and for the oncologists who care for them,” said Douglas Blayney, MD, the Ann and John Doerr Medical Director of the Stanford Cancer Institute and professor of medicine at the School of Medicine. “It will allow investigators to probe questions and sequences that were formerly off limits. For example, when a researcher discovers abnormalities in BRCA genes in the course of whole-genome sequencing or other types of analysis that we routinely conduct at Stanford, he or she can...”

Ruling against human-gene patents is good for patients, scientists say

But Supreme Court’s decision in Myriad case leaves many questions unanswered

Vinod Menon

By Erin Digitale

In autism, brain regions tailored to respond to voices are poorly connected to reward-processing circuits, according to a new study by scientists at the School of Medicine.

“The human voice is a very important sound; it not only conveys meaning but also provides critical emotional information to a child,” said Daniel Abrams, PhD, a postdoctoral scholar in psychiatry and behavioral sciences who was the study’s lead author.

In sensitivity to the human voice is a hallmark of autism, Abrams said, adding, “We are the first to show that this insensitivity may originate from impaired reward circuitry in the brain.”

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See GRADUATION, page 4
Low sperm production in men linked to increased cancer risk

By Bruce Goldman

Men who are diagnosed as azoospermic — infertile because of an absence of sperm in their ejaculate — are more prone to developing cancer than the general population, a study led by a School of Medicine urologist has found. A diagnosis of azoospermia before age 30 carries an eight-fold cancer risk, the study says.

“An azoospermic man’s risk for developing cancer is similar to that for a typical man 10 years older,” said Michael Eisenberg, MD, PhD, assistant professor of urology and director of male reproductive medicine and surgery at Stanford. Eisenberg is lead author of the study, which was published June 30 in *Nature Communications*.

Diagnoses of male infertility and azoospermia are surprisingly common in the United States. About 4 million American men — 15 percent of those ages 15-45 — are infertile. Of these, 600,000 are azoospermic. In the absence of fertility, a physician may be a barometer for men’s overall health,” Eisenberg said, “and a few studies have found an association of male infertility with testicular cancer.”

The new study, he said, not only assigns the bulk of infertile men’s increased cancer risk to those with azoospermia, but also suggests that this extends beyond testicular cancer.

Eisenberg conducted most of the analysis for the study at Stanford, using data gathered from the Texas Cancer Registry and the Baylor College of Medicine in Houston, where he completed his medical training. The study’s senior authors are Larry Lipshultz, MD, and Dolores Lamb, PhD, professors of urology at the University of Texas McGovern Medical School.

The study population consisted of 2,238 infertile men who were seen at a Baylor andrology clinic from 1989 to 2009. The median age was 35.7 when they were first evaluated for the cause of their infertility. Of those men, 451 had azoospermia, and 1,787 did not. There were otherwise no apparent differences between the two groups.

Azoospermia can arise for two reasons. Obstructive azoospermia is caused by a blockage that prevents other sperm from reaching the ejaculate. But a screen of about one-fourth of the azoospermic men in the study population indicated that the vast majority of them suffered from the nonobstructive variety: Their testes didn’t produce enough sperm for any to reach their ejaculate, most likely due to genetic deficiencies of one sort or another.

Fully one-fourth of all the genes in the human genome play some role in reproduction, Eisenberg noted, so there are a lot of ways for the capacity to site offsporing to go astray.

After undergoing a semen analysis, the men were followed for an average of 6.7 years to see which of them turned up in the Texas Cancer Registry. (Fortunately for the analysis, most people tend to stay in the state where they’ve grown up, said Eisenberg.) Their rates of diagnosed cancer incidence were then compared with age-specific cancer-diagnosis statistics of Texas men in general.

In all, a total of 29 of the 2,238 infertile men developed cancer over a 5.8-year average period from their semen analysis to their cancer diagnosis. This contrasted with an expected 16.7 cases, on an age-adjusted basis, for the male Texas population in general (which, Eisenberg said, closely reflects cancer incidence rates for the entire U.S. population). This meant that infertile men were 1.7 times as likely to develop cancer as men in the general population. This is considered a moderately increased risk.

But comparing the cancer risk of azoospermic and nonazoospermic infertile men revealed a major disparity: The azoospermic men were at substantially elevated risk — nearly three times as likely to receive a diagnosis of cancer as men in the overall population. Infertile men who weren’t azoospermic, in contrast, exhibited a statistically insignificant increased cancer risk of only 1.4 times that of men in the overall population.

By excluding men whose cancer diagnosis came within two or three years of their infertility evaluation, the researchers were able to rule out the possibility that azoospermia caused by an undiagnosed cancer had affected the statistics.

While the study wasn’t large enough to delineate which specific types of cancer pushed azoospermic men’s incidence rates up, the varieties of cancer diagnoses they received covered a wide range: brain, prostate and stomach tumors, as well as melanoma, lymphoma, testicular cancer and cancer of the small intestine. The findings suggest that genetic defects that result in azoospermia may also broadly increase a man’s vulnerability to cancer, Eisenberg said, explaining that the notion that azoospermia and cancer vulnerability may share common genetic causes.

The study which was funded by the National Institute for Child Health and Human Development, is the first to examine the cancer risk of azoospermia in particular, or to link it to non-germ-cell cancers. Previous studies have failed to consistently identify any increased risk for nontesticular cancers in infertile men, whether azoospermic or otherwise. In those previous studies, however, azoospermic men couldn’t be separately examined because sperm analyses weren’t available.

Most striking of all, said Eisenberg, was the cancer risk among azoospermic men who had first had their semen analyzed before age 30. They were more than eight times as likely to subsequently develop cancer than Texas males in the general population who were the same age. In contrast, there was no relationship between age of semen analysis and risk for non-azoospermic men.

The good news, Eisenberg said, is that while the young azoospermic man’s cancer risk was quite large compared to their same-age peers, their relative youth means that their absolute risk of contracting cancer during the follow-up period remained small. The bad news, he said, is that men in their 30th often don’t even consider themselves a primary provider. He advised that young men who are diagnosed as azoospermic should be aware of their heightened risk and make sure to get periodic check-ups with that in mind.

The Department of Urology also supported this work.

Five organ transplants in 24 hours sets Packard Children’s record

By Robert Dicks

Mondays are always busy, but this one was out.

In a whirlwind of team heroes, physicians at Lucile Packard Children’s Hospital performed five organ transplants within 24 hours. “We’ve done four in a day before, but never five,” said Louise Furukawa, MD, clinical assistant professor of surgery, starts the transplant of the split liver into the toddler. Soon after, Esquivel implants one portion of the split liver into a 14-year-old boy. After waiting 36 hours.

“It took quick planning and incredible teamwork by surgeons, anesthesiologists, nurses and care teams throughout the hospital.”

It started early on April 22:

• 5:08 a.m.: Esquivel leads surgery to split the liver of a deceased organ donor so that it can be given to two recipients. Meanwhile, Marc Melcher, MD, assistant professor of surgery, removes the deceased liver of a 2-year-old boy. Soon after, Esquivel implants one portion of the split liver into a 15-year-old girl.

• 1:55 p.m.: Olaf Reinhartz, MD, associate professor of surgery, starts heart-transplant surgery on a 3-year-old boy.

• April 23, 1:17 a.m.: Concepcion is producing by Office of Communication & Public Affairs Stanford University School of Medicine 3172 Porter Drive Mail code 5471 650 723-6911 http://news.stanford.edu/news/

Send letters, comments and story ideas to John Sanford at 723-8309 or at jsanford@stanford.edu. Please also contact him to receive an e-mail version of Inside Stanford Medicine.

It's almost 1:17 a.m. Stanislaw, the 3-year-old boy, is alive. But he also needs a kidney transplant for a 14-year-old boy.

“Within minutes, the transplant team of a donor heart to save the life of a baby. Which adds up to six transplants in 36 hours.

Robert Dicks is the senior media relations director for Lucile Packard Children’s Hospital.
Self-defense training for Kenyan girls reduces rape, study finds

By Erin Digitaile

Rape is shockingly common in the slums of Nairobi, Kenya, where as many as one in four adolescent girls are rape victims each year. But a short self-defense course dramatically reduces the girls’ vulnerability to sexual assault, according to a new study from the School of Medicine, Lucile Packard Children’s Hospital Stanford and an organization called No Means No Worldwide.

“Self-defense training taught these young girls to stand up and say ‘no’ with confidence, and empowered them to reorient their own defense to a higher level, if necessary,” said Neville Golden, MD, senior author of the new study, which is now available online on the *Journal of Adolescent Health*. “To our knowledge, this is the first study to demonstrate that a self-empowerment/self-defense course can reduce the incidence of rape in adolescent girls,” added Golden, who is a professor of pediatrics at Stanford and the division chief of adolescent medicine at Packard Children’s.

The study looked at 402 girls who participated in a self-defense program developed by a Kenya-based nongovernmental organization, No Means No Worldwide, that taught them verbal and physical self-defense techniques, and gave them information about how to get help if they were assaulted. Conducted in high schools, the program was designed to combat a culture in which discussing sexual assault is taboo.

In the 10 months after receiving self-defense training, more than half of these girls reported using what they learned to fend off would-be attackers. The proportion of them who were raped fell from 24.6 percent in the year before training to 9.2 percent in the 10-month period after.

James Mathers, MD, professor of surgery, received the Franklin G. Ebaugh Jr. Award for Humanism and Excellence in Teaching, which recognizes an individual who exemplifies the values and accomplishments of Mathers’ work and life.

Six residents were chosen to receive the Arnold P. Gold Foundation Award for Exceptional Commitment to Teaching and Active Involvement in Medical Student Education. The award, which was created in memory of the late Lawrence Mathers, MD, PhD, professor of pediatrics and of surgery, recognizes an individual who exemplifies the values and accomplishments of Mathers’ work and life.

There is a strict code of silence among rape victims in Kenya, especially with the stigma of HIV and AIDS,” said Jake Sinclair, MD, the lead author of the new study and a pediatrician at John Muir Medical Center in Walnut Creek, Calif. “Typically, no one is going to admit that they were raped. Victim-blaming is the norm.” Sinclair and his wife, Lee, co-founded No Means No Worldwide and have developed sexual-assault prevention curricula for several audiences in Kenya, including self-defense programs for girls and women, and educational programs to help boys recognize the harm inflicted by sexual assault.

The subjects of the study were 522 high school girls, ages 14 to 21, in two impoverished Nairobi slums: 402 received 12 hours of self-defense training over six weeks, as well as two-hour refresher courses at three-, six-, nine- and 10-month intervals; 120 in a comparison group received a one-hour life-skills class that is the current national standard in Kenya. Before and 10 months after the training, both groups answered anonymously about their recent experiences of rape.

At the start of the study, nearly one in four girls reported that they had been forced to have sex in the prior year: 90 percent of the victims knew their attackers.

The study focused on rape and did not assess the entire range of behaviors classified as sexual assault under U.S. laws.

Among girls who received self-defense training, 56.4 percent used the skills they learned to fend off attackers in the subsequent 10 months. Of these girls, half used verbal skills alone, one-third started with verbal skills and added physical skills, and 17 percent used physical skills alone. Not only did total assaults drop sharply, but assaults by the two most common groups of perpetrators—boyfriends and relatives—decreased significantly. After receiving training, girls who were raped were more likely to seek help following an attack.

In contrast, among girls who had life skills classes, the proportion who became victims of rape remained about the same.

“We were pretty stunned that the self-defense training was so effective,” Sinclair said. “From the testimonials we collected, we saw that even a small girl could disable an attacker and get away, again and again.”

The self-defense classes, which trained and employed local Kenyan women as instructors, were also cost-effective: Providing the training cost $1.75 per student, whereas immediate after-care for rape in Kenya costs $86, a figure that does not account for long-term costs such as new HIV infections or unwanted pregnancies.

No Means No Worldwide is now testing the effectiveness of its curriculum for boys, which focuses on teaching them not to perpetrate sexual assault. They are also working to disseminate the girls’ self-defense curriculum more widely.

“Often, people focus on women as victims,” said Cynthia Kapkahl, MD, a clinical associate professor of pediatrics at Stanford and an adolescent medicine specialist at Packard Children’s who was also an author of the study. “This work shows that it’s also important to focus on them as empowered beings; that approach can have an important role in a woman’s ability to protect herself.”

The study was funded by Ujamaa-Africa, a nongovernmental organization that promotes health, personal security and economic empowerment for vulnerable women and children.

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Faculty, staff, residents recognized with awards at commencement

At the School of Medicine’s commencement June 15, a number of faculty received annual awards recognizing their dedication to excellence in graduate and medical education, patient care and teaching.

**THOMAS CLANINDIN**, PhD, associate professor of medicine, was the recipient of the School of Medicine Award for Graduate Teaching. The award recognizes teaching excellence, exceptional impact in the graduate classroom and outstanding service on behalf of graduate students at the medical school. Recipients of this award are chosen by medical faculty and MS and PhD students at the medical school.

**JOHN BOOTHROYD**, PhD, professor of microbiology and immunology, was honored with the Stanford University School of Medicine Award for Outstanding Service to Graduate Students. This award, voted on by all graduating MS and PhD students and by the medical faculty, recognizes remarkable and extraordinary service on behalf of medical school graduate students.

**BRIAN RAMBAR**, MD, clinical instructor of medicine, was honored with the Arthur L. Bloomfield Award for Excellence in Clinical Teaching. But a short self-defense Clinical Medicine, which commemorates the late Arthur Bloomfield, MD, chair of the Department of Medicine from 1926 to 1954. The recipient is chosen by students in clinical training.

Three longtime awards created by the Henry J. Kaiser Family Foundation are given each year for excellence in medical education and in clinical and preclinical teaching:

- **ANNA MESSNER**, MD, professor of otorhinolaryngology and head and neck surgery, won the Kaiser Family Foundation Award for Outstanding and Innovative Contributions to Medical Education.
- **JULIE THERTO**, PhD, professor of biochemistry and of microbiology and immunology; **SAKTI SRIVASTAVA**, MD, associate professor of anatomy; and **ANDREW CONNOLLY**, MD, PhD, associate professor of pathology, received the Kaiser Foundation Award for Excellence in Preclinical Teaching, whose recipients are chosen by students in preclinical medicine.
- **RYAN KNUPEL**, assistant clinical professor of infectious diseases, and **JEFFREY DUNN**, MD, clinical professor of neurology and neurological sciences, were presented with the Kaiser Award for Excellence in Clinical Teaching.

**THOMAS CLANINDIN**, **JOHN BOOTHROYD**, **POONAM HOSAMANI**, and **ANNA MESSNER** were also working to disseminate the girls’ self-defense curriculum globally.
Sometimes you have to leave something good to find something even better,” he said, in part explaining his own decision to leave Johns Hopkins University School of Medicine after 19 years to come to Stanford. “In order to discover new oceans, you have to have the courage to lose sight of the shore,” he continued, quoting Lord Chesterfield, a British statesman and man of letters.

He introduced Kobilka as a dogged researcher who came to Stanford in 1989 after attending Yale Medical School. Kobilka looked a little uncomfortable and nervous onstage — and he confirmed that’s how he was feeling. “It’s somewhat ironic that I’m here addressing the class of 2013,” Kobilka said. “First, Stanford was one of the many medical schools that rejected my application. Second, I might be considered a failed physician. It has been many years since I practiced medicine. ... I would have been better prepared with a PhD in biochemistry or physics. So in a way, I’m equally unqualified to address both the medical and graduate students.”

That drew a laugh from the crowd, along with cheers from the PhDs onstage.

Kobilka traced the story of his career, beginning with his childhood in Little Falls, Minn., population 7,000. “I had a pretty unremarkable childhood. My parents were loving and supportive. Neither went to college. My father was a baker. My mother was a housewife who worked part-time as a cake decorator. I don’t remember any pressure from my parents ... to do well academically or enter any particular career. I consider this one of their greatest gifts to me. They gave me a blank canvas or to enter any particular career. I consider this one of the PhDs onstage.

Kobilka chose to leave Little Falls, eventually going to medical school, where he developed an interest in intensive-care medicine and the drugs used in life-or-death situations that act on G-protein-coupled receptors, or GPCRs — particularly in the receptors for adrenaline and noradrenaline, which open the airways and boost heart rate.

In the 1980s, Kobilka joined a lab at Duke University led by Robert Lefkowitz, MD, with whom he would eventually share the Nobel Prize for work on GPCRs, which serve as one of the main methods of communication within the body. They act as molecular switches, regulating nearly every physiological process in us.

“In 1986, I found my passion and the basis of my career for the next 25 years,” Kobilka said. In 2011, while at Stanford, Kobilka and his team were the first to obtain a three-dimensional image of the exact molecule while simultaneously kicking off a cascade of hundreds of reactions inside the cell. Such knowledge could lead to the design of better drugs to activate or inhibit the receptors.

Few believed it was even possible to achieve such a goal, and many thought it might be a waste of time, but Kobilka persevered, facing multiple failures and financial challenges along the way. “I wish you well in finding your passion,” he said, addressing the graduates. “Don’t give up till you find it.”

For their part, the student speakers at the graduation ceremony gave thanks to family and friends for their support, both emotional and financial.

“At some point during our four to 11 years at Stanford, we were short with you, we took liberty with your patience, exhausted your generosity and asked for more, like the greedy-little-children-turned-doctors we’re about to become,” said Long Nguyen, class speaker for the MD students. “We were never as busy as you thought” — big laugh from the audience — “not as tired as we claimed, but you gave us the space and time we needed to develop.

“You loved us so that we could learn to care for others,” he said. “Join us for the lunch after the ceremony. That should get us all squared up.”

Masoud Sadaghiani, class speaker for the PhD students, said, “If a kid like myself who couldn’t speak a word of English 15 years ago — who literally looked up when he was asked, ‘What’s up?’ in high school — can stand before you today with such an accomplished group of individuals, we have come a long way.”

After the diplomas were handed out, the new graduates joined their families and friends, who eagerly awaited them with flowers, hugs, tears and cameras.
Autism continued from page 1

The study focused on children with a high-functioning form of autism. They had IQ scores in the normal range and could speak and read, but had difficulty holding a back-and-forth conversation and identifying emotional cues in another person’s voice. The scientists compared functional magnetic resonance imaging scans from 20 of these children with scans from 19 typically developing children, paying particular attention to a portion of the brain that responds selectively to the sound of human voices. Prior research has shown that adults with autism have low voice-selective cortex activity in response to speech. But until this study by Menon and his colleagues, no one had looked at connections between the voice-selective cortex and other brain regions in individuals with autism.

The next steps for researchers include studying the consequences of the weak voice-to-reward circuit in autism. “It is likely that children with autism do not attend to voices because they are not rewarding or emotionally interesting, impacting the development of their language and social communication skills,” Menon said. “We have discovered an aberrant brain circuit underlying a core deficit in autism; our findings may aid the development of new treatments for this disorder.”

For the past six months, Wu has served as co-director of the institute with Robert Harrington, MD, professor and chair of the Department of Medicine. Wu came to Stanford in 2004. He is a graduate of the Yale School of Medicine. He completed his residency and cardiology fellowship training, followed by a PhD in molecular pharmacology, at UCLA. His research lab specializes in stem cell biology, gene therapy, genomics and molecular imaging.
explore the findings more fully, just like with non-BRCA genes.

Myriad Genetics, the company of Myriad's chief executive officer, says it has been able to reduce the prevalence of BRCA mutations from about 12.8 percent in 2002 to 2.9 percent in 2012 by correlating patient sequences with a panel of information, including personal and family history, the presence or absence of certain cancers, and environmental factors. Myriad's proprietary database of tens of thousands of BRCA mutations may negate the need for routine genetic testing, and Myriad is able to provide no-cost, preventive care for women with a qualifying mutation.


tient's BRCA1 and 2 genes to generate breast-cancer-risk estimates. Soon it was the only company in the United States that patients could use to assess their risk of developing breast cancer.

As a result, Myriad has amassed its database of thousands of sequences from a variety of BRCA genes isolated from human chromosomes, the first "breast cancer gene," BRCA1, and a race began to sequence with BRCA-1.

"This is a good thing for the oncologists who care for them," said Michael Snyder, PhD. Snyder directs Stanford's Program on Stem Cells in Society, believes that the court's judgment is in on the chromosomal location of a gene involved in breast cancer patient sequences with a panel of information, including personal and family history, the presence or absence of certain cancers, and environmental factors. Myriad's proprietary database of tens of thousands of BRCA mutations may negate the need for routine genetic testing, and Myriad is able to provide no-cost, preventive care for women with a qualifying mutation.


In the end, no matter how philosophical the discussion, a clinician's key concern is the patient entrusted to his or her care. And Blayney and Pegram assert that the court's decision should enable patients to have ready access to their BRCA sequences and the resulting clinical interpretations. But the court's decision almost certainly will lead to increased competition among providers and interpreters, and the resulting competition likely will help to sharpen the diagnostics and advance the science, the researchers say. Soon, the choices available to patients will be, well, myriad.
Laser surgery for cataracts is ‘phenomenal,’ patient reports

By Sara Wykes

Mary Savoie was looking forward to the surgery on her cataracts, which were interfering with many of her favorite activities.

At 80, Savoie, who lives in Palo Alto, represents the one in every two people her age whose vision has become so limited by the yellowing lenses in the eye that surgery is needed to regain a full and active life.

Savoie’s vision was so impaired by her cataracts that she had stopped driving at night. “I might not have had anywhere to go, but it made me feel trapped,” she said. An avid reader, she had begun to struggle with words on the page. And the stress of playing bridge, another of her passions, made her eyes feel dry.

“Savoie’s vision is so impaired that she said she was a child when she last saw the sky so blue. ‘I can’t tell you how wonderful I feel,’” said Artis Montague, MD, director of cataract surgery services at Stanford and director of the Operating Rooms at the Byers Eye Institute. “Experienced surgeons are quite good at creating these circles, I’ve drawn thousands of them, and can create that circular opening very well, but compare me making that circle to a laser making that circle, and the laser is going to be perfect every time.”

That perfection, guided by a three-dimensional scan of each patient’s eye, is just the first step. Because the laser opens up the cataract into a latticework of tiny squares, the surgeon then can remove the cloudy lens with far less ultrasound energy. The difference in impact and inflammation is substantial, compared to the traditional surgery. Nearly a month after the traditional surgery on her left eye, Savoie still feels the tightness that patients typically experience. In her right eye, done with the aid of the laser, she feels nothing at all except for that dramatic improvement in vision.

“The difference is phenomenal,” Savoie said. “I would highly recommend this new process.”

Montague, who said he is traditionally conservative by nature and cautious to adopt new things, is impressed by the innovative technology, which is based on the ideas of Stanford clinicians and researchers. “Patients are happier, and that’s why I went into medicine — to help patients, so for me it’s very satisfying,” she said. “It feels so much safer. Time will tell, but I think it has the potential to change cataract surgery tremendously.”

Laser technology has been used for decades to reshape the cornea to correct nearsightedness, farsightedness and astigmatism. The challenge of using it in cataract surgery is to control the laser’s intensity to avoid collateral damage to surrounding tissue, the retina and other parts of the eye, yet still to power the precise incision required for the cataract removal.

The laser device used in the surgery provides a non-invasive imaging technique to create a 3-D computerized map of the eye that forms the basis for an ideal pattern for the laser to follow. That pattern is then superimposed on the three-dimensional image of the patient’s eye to confirm for the surgeon that the laser is on target. It also allows the surgeon to monitor the laser’s incisions.

“The relatively low amount of energy needed to remove the lens reduces the risk of infection and minimizes damage to surrounding tissue, including the corneal epithelium, and other complications.”

Nearly 60 years ago, Savoie’s mother had cataracts removed from both her eyes. “She was a week in the hospital with sandbags on each side of her head the whole time,” Savoie said. “When I think about that, I think how amazed she would be now.”

Sara Wykes is a writer in the communications office at Stanford Hospital & Clinics.