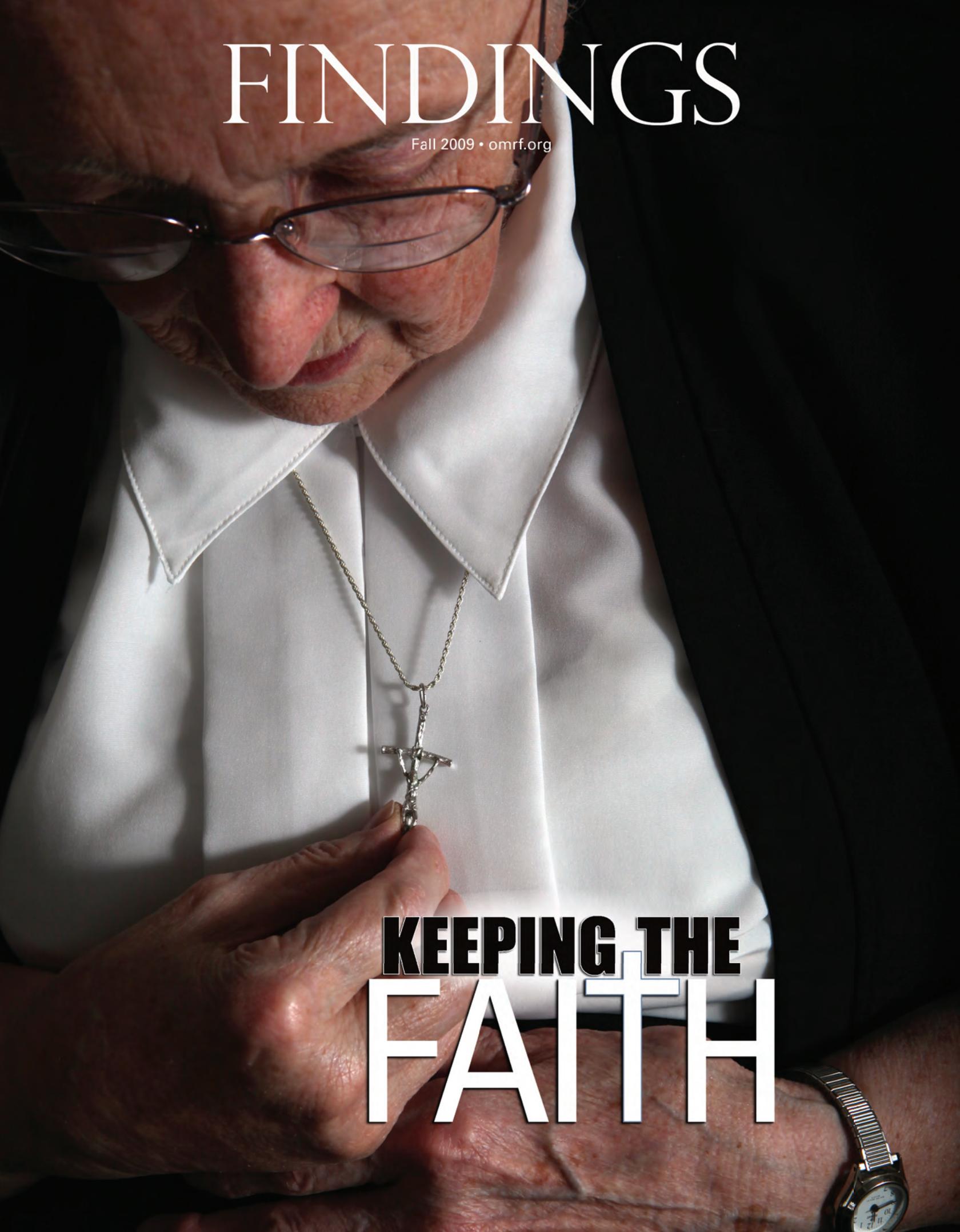


FINDINGS

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Chartered in 1946, OMRF is an independent, nonprofit biomedical research institute dedicated to understanding and developing more effective treatments for human disease. Its scientists focus on such critical research areas as Alzheimer's disease, cancer, lupus and cardiovascular disease.



A United Way Partner Agency



10

SISTER ADRIAN SCHMIDT may seem an unlikely candidate to unlock the secrets of Alzheimer's disease, but she and other Catholic clergy are helping scientists at OMRF crack the code of a devastating illness that affects more than 25 million people.

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Ride the rapids with an OMRF scientist

>>interactive.omrf.org

BLOWIN' IN THE WIND

Living in Oklahoma, I know about wind. But rarely have I been more aware of its power than on the Monday before Memorial Day.

That day marked the groundbreaking for OMRF's new research tower. At the conclusion of the ceremony, with the help of some nifty rigging and a 150-foot crane, we unveiled one of the 24 DNA-shaped wind turbines that will crown the new building.

As if on cue, the 20-foot-tall turbine began spinning in the wind. The crowd began applauding. And it once again struck me that OMRF—which will be the first medical research facility anywhere to harness the wind to help power its labs—continues to break new ground in everything it does.

Since OMRF first opened its doors more than a half-century ago, our scientists have given the world the first treatment for a deadly blood infection that claims a half-million lives each year. A powerful test to predict the risk of developing breast cancer. Groundbreaking advances in the battles against HIV and lupus. And most recently, an experimental drug that offers the first real hope of stopping Alzheimer's disease.

These are discoveries that have touched and saved countless lives. They've come about because OMRF is an institution that places the highest priority on innovation, on refusing to accept the status quo. And it's this spirit that drives the newest chapter in OMRF history.

The tower will add 186,000 square feet of laboratory, administrative and clinical research space. When complete, it will house a state-of-the-art research clinic for patients suffering from multiple sclerosis and other autoimmune diseases. It will also house 34 new labs, where scientists will probe medical problems ranging from heart disease to arthritis and immunology.

The facility will also become Oklahoma's second gold-certified LEED (Leadership in Energy and Environmental Design) building. Innovative technologies will work with other energy-saving features to decrease electricity usage by 37 percent and total power use by 17 percent.

Of course, a building is only as special as the people inside it, and this tower will be home to world-class researchers who will drive the next generation of life-changing discoveries. These scientists will not only develop a deeper understanding of the human body; they'll transform those breakthroughs into treatments for Oklahomans and people everywhere.

So next time you feel a stiff breeze come sweeping down our plains, imagine those DNA-shaped turbines spinning. Very soon, they'll be powering labs where OMRF scientists will be working to bring longer, healthier lives to us all.

Stephen M. Ruscott

Flash Forward

Can't wait till OMRF's research tower opens its doors in 2011? Take a virtual tour today.

>> tower.omrf.org



SEEING GREEN

Thanks for your informative magazine, *Findings*. The OMRF expansion is quite an impressive undertaking, and your green approach is at the cutting edge.

MORTON SKORODIN
STILLWATER

I am very proud and impressed with what OMRF has done for the medical community and those with medical needs. Also, I am happy to see that you are using wind turbines as part of your new research tower. The part that has me concerned is that a California-based company was chosen as the distributor for this project. Why was an Oklahoma company not part of this process?

TODD FANCHER
OKLAHOMA CITY

We, too, were disappointed that we could not identify any local vendors specializing in wind-energy systems of this type, as we prefer to support our local community. OMRF ultimately chose a California-based company because our architects had previous experience with this distributor, and we've been quite pleased with the results. But for future projects, just as we did with this one, we'll look right here at home first.

FOR FUTURE GENERATIONS

OMRF is doing absolutely amazing work. I lost my mother-in-law to breast cancer six years ago and hope that advances like those you have made mean my wife will never go through what her mother did.

PATRICK HANSEN
AUSTIN, TX

MAKE ROOM FOR DANNY

Many were quick to spot Danny Thomas yucking it up with Elvis Presley on the back cover of the last issue.

Danny Thomas is Elvis' pal on the back of the Spring/Summer 2009 edition of *Findings*. I appreciate the research that is done at OMRF and look forward to your new research tower.

KATHY HILL
COLLEGE STATION, TX

I believe the mystery person is Danny Thomas, founder of St. Jude's. When I was 14, in 1969, I collected money door-to-door for St. Jude's in St. Charles, Mo. I think I collected a total of \$14.00 and received a ticket to a concert at Kiel Auditorium in St. Louis. It was my first fundraiser. Thanks very much for your magazine and research work.

PAT REIF
NORMAN

FOLLOW US ONLINE!



Alzheimer's disease will rob 60—yes, 60—percent of us of someone we love. I never imagined my mother would lose herself, her laughter and ability to feed herself or walk. That she would no longer recognize me, know how to swallow or draw a breath. It's a terrible way to learn the meaning of true love. But here in Oklahoma, we have one of the top medical investigators in the world, Dr. Jordan Tang, leading a team that is working each day to solve this mystery of human health. Be thankful, as I am, for this dedicated researcher and OMRF's determination to understand and prevent this most cruel of diseases.

BECKY SWITZER
NORMAN

WRITE TO US!

Send your letters to *Findings*, 825 Northeast 13th Street, Oklahoma City, OK 73104 or e-mail us at findings@omrf.org. Please include your name and address. If we publish your letter, you'll receive an OMRF T-shirt.



FIGHTING A PANDEMIC

AS A NEW STRAIN OF H1N1 influenza emerged this past spring, experts feared it might follow the pattern of the 1918 flu, the world's deadliest epidemic. So the Centers for Disease Control and Prevention turned to select medical research centers around the country for help.

Among those the CDC enlisted were OMRF immunologists Linda Thompson and Judith James. Their assignment: Help gather antibodies against the virus.

Antibodies are proteins manufactured by the immune system to fight infection. They also represented a key research avenue as health officials scrambled to develop effective ways to diagnose and treat those infected with the pathogen.

In 2008, OMRF scientists developed a method of isolating the genes encoding antibodies and created a nearly unlimited supply of them in the lab. Using this procedure, they'd already generated scores of potential antibodies to H1N1 influenza. Within days of the CDC's request, Thompson, James and their research team had sent 67 of these candidate antibodies to the government agency. Subsequent efforts generated another 29 antibodies, which the OMRF team also sent to the CDC in Atlanta.

"There aren't very many places that generate these antibodies, so we were a major source," says James, who holds the Lou C. Kerr Endowed Chair in Biomedical Research at OMRF.

While none of the antibodies made by OMRF proved to be a magic bullet, the CDC has been able to create both a diagnostic test and a vaccine that will become available this fall. Both will be crucial as the country battles a pandemic that could strike tens of millions in the U.S.

Fortunately, says James, "The H1N1 flu we've seen to date has had symptoms similar to ordinary seasonal influenza." While this is good news, efforts to combat H1N1 remain a priority at the CDC, as the virus has started earlier and proven more contagious than typical flu strains. And even in a non-H1N1 year, flu in the U.S. causes about 200,000 hospitalizations and 36,000 deaths.

In addition, warns James, the current strain of H1N1 flu could mutate to a more dangerous form. So the OMRF researchers are carrying on their work. "If we could find an antibody that neutralizes the virus, it could play a big role in treating the people who are the sickest or who are having trouble getting rid of the virus," she says.

As she continues her research, the physician-scientist—and mother of a 10-year-old—is doing her best to avoid H1N1 infection. Her defense strategy?

"Just what I tell my patients: Wash your hands frequently and effectively, avoid contact with those who are sick whenever possible, and if you develop symptoms—especially a fever—see your health care provider."

HOW I SPENT MY SUMMER VACATION

WHEN SUMMER 2009 rolled around, Sean Olsen's choices were rather limited. Burger flipper. Lifeguard. Sir Alexander Fleming Scholar at OMRF.

The 19-year-old chose the final option. But only reluctantly.

"When my teacher pushed me to come to OMRF to try my hand at research for the summer, I figured it would be a good resumé builder, nothing more," says Olsen, a Chickasha native who attends Redlands Community College in El Reno. "Both of my parents are nurses, and I was in school to become a nurse, too."

But a funny thing happened on the way to buffing up his resumé: Olsen found a new calling.

In the lab, Olsen studied the origins of a newly discovered type of cell that plays an important role in the human immune system. As he realized the implications of his work—that it could help the millions of Americans who suffer from autoimmune diseases—Olsen decided on a new career path.

"Nursing is one of the most important fields out there, and the care nurses give is absolutely essential. But by working in medical research, I might have the opportunity to care for people on a broader scale. And that's why I was interested in medicine to begin with."

Although the summer is over, Olsen hopes his career as a medical researcher has just begun. He's continuing to work at OMRF as a lab technician for his summer mentor, Dr. Darise Farris, while he completes his undergraduate degree. Then, if things go as planned, it's on to graduate school, where he imagines he'll study biology and perhaps one day join Farris in helping to lay bare the causes of lupus.

Although Olsen's story is his own, he was not the only 2009 Fleming Scholar whose eyes were opened by spending eight weeks in OMRF's labs.

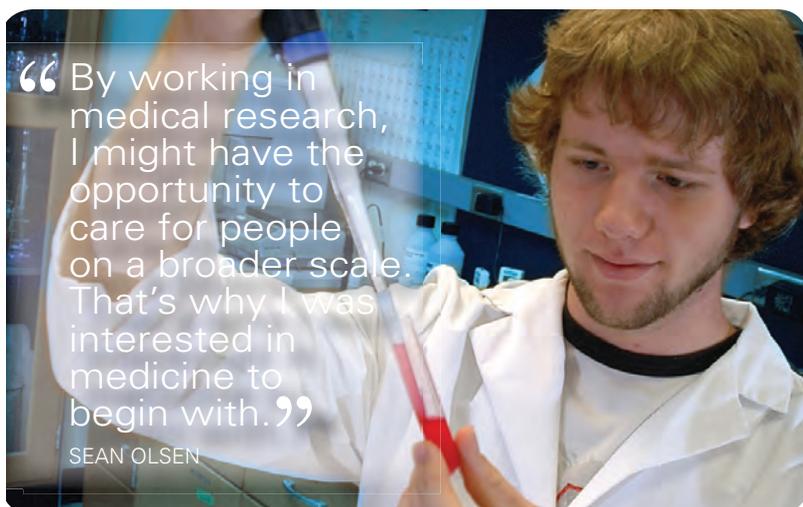
"Being a part of the Fleming program this summer proved to be one of the most meaningful and exciting opportunities I've had," says Alva's Ganga Moorthy, now a sophomore microbiology major at the University of Oklahoma. At OMRF, she studied how environmental factors can affect human health, particularly lung disease. "I got to work alongside some of the world's best scientists on research that is truly cutting-edge and making an impact on human lives."

Over the years, more than 100 Fleming Scholars have gone on to careers in medicine and research, including Dr. Rod McEver, who joined OMRF's scientific staff in 1988 and now heads the Cardiovascular Biology Research Program. According to McEver, the Fleming program not only develops young minds—it also opens new channels of inquiry at OMRF.

"Having a bright, curious student in the lab is always a valuable experience for the researchers," he says. "A talented young person raises new questions and offers fresh perspectives on science."

Fleming Facts

Since 1956, nearly 500 Oklahoma high school and college students have spent their summers working alongside senior OMRF scientists as Fleming Scholars. The donor-supported program is named for Sir Alexander Fleming, the Nobel Prize-winning British scientist who discovered penicillin. He first visited the U.S. in 1949 to serve as the keynote speaker at OMRF's groundbreaking.



“By working in medical research, I might have the opportunity to care for people on a broader scale. That’s why I was interested in medicine to begin with.”

SEAN OLSEN



A TIMELESS GIFT

Every moment of every day, clocks were ticking in Frieda Fitzgerald's home. Wall clocks, desk clocks, cuckoo clocks. They filled the walls and shelves of every room in her house.



It was a collection Frieda and her late husband, H. Douglas, worked years to amass. When H. Douglas Fitzgerald's days ran short—he died in 1989—Frieda, a retired Oklahoma City receptionist, devoted much of her time to her nephew Timothy Garen, who suffered from muscular dystrophy and, eventually, kidney failure and diabetes.

The clocks ticked as her nephew's health declined from the ravages of disease. She accompanied him to dialysis sessions and saw firsthand how he suffered. Upon his death, she made a pledge to do whatever she could to help others enjoy what her nephew could not—a long, healthy life.

When Frieda herself died in 2007 at the age of 76, she left her entire estate, in Timothy's memory, to support medical research at the Oklahoma Medical Research Foundation. When her estate closed, OMRF received the balance of her bequest—a gift totaling \$401,658.

"Frieda never met a stranger," says longtime friend Clifford Brown. "She was always doing something for someone else. She was a woman of modest means, but her nephew's health issues really touched her heart. Frieda's generosity sets a wonderful example for the rest of us to give to something that really matters to us but will also make a difference for others."

Frieda had many passions in her life—Oklahoma City Blazers hockey, collections of all kinds and taking care of everyone around her. But her greatest joy, Brown said, was giving, and she did so to the end.

"I have come to the conclusion that perhaps the best thing I could do would be to leave my entire estate to medical research in Tim's memory," Frieda wrote two years before her death. "If my small contribution can help find a treatment or cure for any of these illnesses so that another child could be spared these debilitating diseases, I cannot imagine a better usage of what I have accumulated during my lifetime."

Her gift will go to support research at OMRF, where scientists study a variety of conditions related to muscular dystrophy. OMRF researchers are also investigating the cellular processes central to diabetes as well as diseases in which kidney failure is a leading cause of death.

"People like Frieda Fitzgerald mean so much to OMRF, not simply because of the gifts they give but because of their passion for life and health," says OMRF President Stephen Prescott. "She gave everything she had to effect change in the lives of people she would never know."



Dr. Marta Alarcón-Riquelme, *Analysis of the Novel SLE Gene BANK1 on B-Cell Function*, Oklahoma Center for the Advancement of Science and Technology

Dr. José Alberola-Ila, *Understanding the Genetic Networks that Control CD4 T Cell Lineage Commitment*, American Heart Association

Dr. Dean Dawson, *Segregation of Error-Prone Chromosomes in Meiosis*, National Institute of General Medical Sciences

Dr. Michael Dresser, *Mechanics and Regulation of Chromosome Dynamics in Meiotic Prophase*, National Institute of General Medical Sciences; *Mechanism of Force Generation at Telomeres*, Oklahoma Center for the Advancement of Science and Technology

Dr. A. Darise Farris, *T Cell Tolerance and Autoimmunity to Nuclear Antigen La*, National Institute of Allergy and Infectious Diseases

Dr. Robert Floyd, *Pre-Clinical Study of Combination Oral Treatment for Acute Acoustic Trauma*, Office of Naval Research

Dr. Courtney Gray-McGuire, *Genes for Early Systemic Lupus Erythematosus Autoimmunity in African Americans*, Arthritis National Research Foundation; *Localization of Colon Cancer Susceptibility Gene via Genetic Association*, Prevent Cancer Foundation

Dr. John Harley, *Genes from SLEGEN, The Lupus Genetics Consortium*, Alliance for Lupus Research; *Genetic Linkage in Lupus*, National Institute of Allergy and Infectious Diseases; *Genetic Association in American Blacks with Lupus*, National Institute of Arthritis and Musculoskeletal and Skin Diseases

Dr. Judith James, *Kirkland Scholar Award*, Mary Kirkland Center for Lupus Research; *Science in a Culture of Mentoring*, National Center for Research Resources; *Oklahoma Autoimmunity Center of Excellence*, National Institute of Allergy and Infectious Diseases

Dr. Paul Kincade, *Early Events in Mammalian B-Cell Differentiation*, National Institute of Allergy and Infectious Diseases

Dr. Rodger McEver, *Mechanisms for Blood Cell Adhesion Under Flow*, National Heart, Lung and Blood Institute; *Protein-Glycan Interactions in the Vascular System*, National Heart, Lung and Blood Institute

Dr. Joan Merrill, *LCTC Lupus Data Registry*, Lupus Clinical Trials Consortium

Dr. Kenneth Miller, *Signal Pathways That Regulate Synaptic Transmission*, National Institute of General Medical Sciences

Dr. Kevin Moore, *Identification of Tyrosine-Sulfated Proteins in the Male Genital Tract*, Eunice Kennedy Shriver National Institute of Child and Human Development

Dr. Kathy Moser, *Gene Mapping in Women with Systemic Lupus Erythematosus*, National Institute of Arthritis and Musculoskeletal and Skin Diseases

Dr. Swapan Nath, *Identifying the Novel SLE Susceptibility Gene on 5p15.3*, National Institute of Allergy and Infectious Diseases

Dr. Dario Ramirez, *Free Radicals and Redox Signaling Triggered by Lipopolysaccharide in Macrophages*, National Institute of Environmental Health Sciences

Dr. Xiao-Hong Sun, *Mechanism of T Cell Lymphoma in E Protein Deficiency*, National Cancer Institute; *Notch-induced Protein Degradation in Lymphopoiesis*, National Institute of Allergy and Infectious Diseases

Dr. Jordan Tang, *Beta Secretase Inhibition for Treating Alzheimer's Disease*, National Institute on Aging

Dr. Rheal Towner, *Therapeutic Evaluation of Magnetic Nanoprobes Specific for Malignant Tumor Marker*, National Cancer Institute

Dr. Carol Webb, *Bright Function in the Immune System*, National Institute of Allergy and Infectious Diseases

Grants Awarded

(January-June, 2009)

Dr. Xiao-Hong Sun

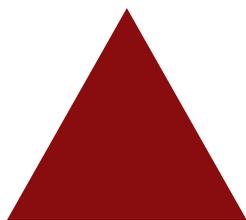


FOR MORE THAN 20 YEARS,

OMRF's Dr. Xiao-Hong Sun has studied the formation of the immune system and leukemia. Recently, she and her colleagues made a new discovery about the role two genes play in the development of certain types of cancer. Their findings offer important clues about the causes of breast cancer and certain types of leukemia—and how they may be stopped. The research appears in two scientific journals: *Molecular and Cellular Biology* and *PLoS One*.

“These studies are important for finding a cure. If we can understand what genes are involved in cancer, we may be able to block their function.”

DR. XIAO-HONG SUN



HIGHER POWERS

BY GREG ELWELL

PHOTOS BY JOHN CLANTON

HOW 1,100
NUNS, PRIESTS AND *brothers* ARE HELPING
OMRF RESEARCHERS
UNLOCK THE **SECRETS** OF **ALZHEIMER'S**



At the Sisters of St. Joseph Motherhouse in La Grange, Illinois, most of the retired nuns have hung up their habits. As they're winding down their lives of devotion, they've traded out their monochromatic vestments for something a bit more casual. But not Sister Adrian Schmidt.

She still wears the black and white garments of her order. Of course, this being a suburb of Chicago, she does allow herself one indulgence: a red, white and blue Cubs patch that adorns the chest of her black vest.

Sister Adrian, 81, may seem an unlikely candidate to unlock the secrets of Alzheimer's disease. But through her work with a groundbreaking research project, she and other Catholic clergy are helping scientists at the Oklahoma Medical Research Foundation and throughout the world crack the code of a devastating illness that now affects 26.6 million people worldwide.

As a Sister of St. Joseph, Sister Adrian has given more than a half-century of her life in service to the Lord. She spent 50 years working in the kitchens of nunneries around the country, then another decade as house administrator for the Sisters of St. Joseph. A broad smile lights her face when she speaks of the sisterhood, the dear friends with whom she's shared every piece of her life. But when the conversation turns to one such friend, her eyes grow moist behind her thick glasses.

"She studied art in Europe, you know," Sister Adrian says. "The things she could do with stone were simply amazing. You'll see what I mean when we go into the chapel." Indeed, when you enter, you're greeted by a formidable chunk of alabaster, carved and worn and polished into the likeness of Mary, the mother, cradling the infant Jesus.

It's the most ornate object in a room that is sparse by design. White walls give way to breaks and bursts of color from stained glass. Sister Adrian comes here often, treading across the burgundy carpet and past the lightly stained wooden pews to dip her fingers into the bowl of holy water.

She loves the silence, the beauty of this contemplative space. But here, her thoughts will sometimes take her to dark places.

There was no harder task than watching Alzheimer's disease erase her friend. Hands that once shaped sculptures and planed wooden altars eventually lost the ability even to cut string. By the time Alzheimer's ended her life, the person inside had long since vanished.

So when a man asked Sister Adrian if she'd help save others from the same fate, she didn't think twice.

There's one sticky detail, he said. We're going to need your brain after you die.

"Some people think donating your brain to science is scary," says Sister Adrian. "That's not scary. Scary is watching your friend disappear before your eyes."



RELIEF PITCHER Sister Adrian Schmidt (pictured here and on the preceding page) volunteered for the Religious Orders Study because "it was a way to contribute to science and the betterment of mankind."

FAITH AND MEDICAL RESEARCH may seem like strange bedfellows. But in the quest to understand how the human brain ages, nuns have played a pivotal role.

More than two decades ago, Dr. David Snowdon, an epidemiologist at the University of Kentucky, saw that the key to Alzheimer's research was keeping variables to a minimum. In other words, if he could find a group of people who led similar lives, then zero in on a single factor—say, their diets—he had a much better chance of determining what role that factor might play in the onset (or prevention) of Alzheimer's. And if he could study those individuals over a long period of their lives, all the better.

In 1986, Snowdon began what would become known as the Nun Study. With the cooperation of the 678 School Sisters of Notre Dame, who lived in convents in seven states, Snowdon and colleagues began examining every aspect of the nuns' lives. By studying a group with so much in common, the scientists hoped to eliminate many of the extraneous variables that might otherwise confound their research. The nuns had similar diets, health care and living conditions; consumed little or no alcohol; and did not smoke, use drugs or have children.

Each year, the researchers administered medical and cognitive tests to the nuns. They analyzed the women's genes and measured their balance and strength. They tested how many words the sisters could remember after reading them on flashcards, how many animals they could name in a minute and whether they could

“Some people think donating your brain to science is scary. That’s not scary. Scary is watching your friend disappear before your eyes.”

count coins correctly. The scientists parsed the autobiographical essays the women wrote when they first joined the order. And as the nuns have died—fewer than 100 remain—their brains have been removed and shipped to a laboratory where they are, of course, analyzed.

The study has yielded a treasure trove of information about how the brain ages. For example, it has shown that small, barely perceptible strokes may trigger some dementia. That folic acid may help stave off Alzheimer’s disease. And that the nuns who packed the most ideas into their early autobiographies were less likely to develop Alzheimer’s a half-century later.

As the findings emerged, the medical research community recognized the power of the Nun Study. So in 1993, Dr. David Bennett launched a follow-up effort. This research, dubbed the Religious Orders Study, expanded its rolls to include more than 1,100 nuns, priests and brothers in 32 Catholic orders in 13 states. Led by Rush University Medical Center in Chicago, researchers would study their subjects’ cognitive abilities during life and, upon their deaths, their brains. Everything the scientists did would be keyed to understanding the transition from normal brain function to Alzheimer’s disease.

Among the researchers they tapped to assist them was OMRF’s Dr. Kenneth Hensley. A biochemist by training, Hensley studies inflammation that occurs in the brain when it is struck by neurodegenerative diseases such as Alzheimer’s.

For Hensley, the Religious Orders Study represented something of a full career circle: As an undergraduate and later a doctoral candidate at the University of Kentucky, he’d studied with Snowden. He’d learned much about the Nun Study, and he felt lucky to participate in a project that not only stands the chance to make important contributions to science but also one that is driven by such charity.

“The nuns, the priests, the brothers—they surrender their lives to service. And when they die, they literally give themselves to us,” says Hensley. “I can’t think of a more sacred gift.”

HER WALKER PARKED behind her chair, Sister Ellen Springer sits at a scarred wooden table with the other nuns who work in the Sisters of St. Joseph print shop. The simple tasks she performs—cutting, folding and stapling—do not tax her intellect. But she finds peace in the repetitive work.

“We all have jobs to do, and this is mine. It’s just how I help out around here.”

For 48 years, Sister Ellen, now 86, had another job: She taught science at a Catholic high school. When she retired from teaching

in 1994, she joined the Religious Orders Study. “Nuns are not immune to disease,” she says. “We suffer from heart attacks and cancer and Alzheimer’s disease, same as anybody.”

In the 15 years since, she has come to look forward to the annual January visit of the research team from the Religious Orders Study. The researchers ask her questions about her diet and activities. After a physical assessment, they test her memory and cognitive abilities.

Some of the questions are simple: What’s the date today? The day of the week? The season? The researchers show Sister Ellen flash cards and ask her to identify the pictures that appear on them. And when she reaches the end of the deck, she must recite the order in which the pictures appeared.

POP QUIZ A retired science teacher, Sister Ellen Springer looks forward to her annual testing sessions with the Alzheimer’s researchers. “It reminds me of being in the classroom.”





FINAL DESTINATION When study participants die, their brains travel to the Rush University Medical Center, where technicians dissect the organs so that researchers like OMRF's Dr. Kenneth Hensley can analyze them.

The researchers then tell her a detailed story. When they finish, they ask Sister Ellen to recount what she heard. Five minutes pass, and they once again ask her to recount the story.

All of this data gathering is aimed at providing new insights into the nature of memory. "As the brain ages, it naturally atrophies," says OMRF's Hensley. "What we're trying to figure out is how to develop your brain so, even as the pathology accumulates, you don't lose your memory."

Sometimes, seemingly mundane data speak volumes. For example, tracking the participants' diets has led to new information on the role omega-3 fish oils play in the ability to remember. Detailed clinical evaluations provided the first evidence linking weight loss among the elderly to the onset of Alzheimer's. The yearly assessments have also broken important new ground in showing that the brain, like other organs, needs to be "exercised" and that continued intellectual activities (such as reading and crossword puzzles) help keep dementia at bay.

"The real power of the Religious Orders Study is its scope," Hensley says. "By studying such a large group of individuals over a long period of time, we have access to tremendous amounts of data. Combing through the subtleties of that data has produced many important findings."

Indeed, the study has now generated more than 100 scientific publications. And for at least one retired nun, volunteering as a research subject has provided one more chance to continue a life of altruism.

"If it can help somebody, who am I to say no?" Sister Ellen says. "Helping is part of who I am."

LIKE ALL THE CLERGY who've volunteered for the Religious Orders Study, Sister Ellen's participation will eventually take her—sort of—to a cramped lab on the west side of Chicago. It is there, to the Rush University Medical Center, that her brain will travel upon her death.

Lessons From NUNS

Protect your brain from Alzheimer's by

- ✓ Staying physically active
- ✓ Keeping calm in the face of distress
- ✓ Exercising your brain
- ✓ Avoiding depression
- ✓ Maintaining a large network of friends

(Based on findings from the Religious Orders Study)

Up close, the human brain is a gray-beige mass, thick with wrinkles and folds and run through with tiny red veins. The ones that come to Rush have been harvested by an autopsy team that deploys to any of 13 states in which the participating religious orders are located. Once the organs arrive, technicians dissect the organ, creating smaller cross-sections and blocks. They take extensive measurements and notes to characterize the samples' physical characteristics, then package and send them to research sites around the country, including Hensley's lab at OMRF.

As a collaborating scientist in the study, Hensley is examining one particular piece of the Alzheimer's puzzle. Specifically, he is focused on the protective role of vitamin E and other tocopherols—fat-soluble antioxidants derived from plants.

Over the years, many have hypothesized that vitamin E helps stave off Alzheimer's. Indeed, a recent analysis of clinical data gathered from Alzheimer's patients at Massachusetts General Hospital indicates that it may slow the decline of patients suffering from the disease. But Hensley's work suggests that other tocopherols might do a far better job of protecting the brain from Alzheimer's.

"Our research indicates that one particular tocopherol"—known as gamma tocopherol—"may protect the brain by lowering protein levels associated with Alzheimer's. It seems to reduce local inflammation and free radicals in a way that vitamin E cannot."

In his lab, Hensley is analyzing samples taken from the brains of 30 clergy members who participated in the Religious Orders Study. He is also studying 279 samples of participants' cerebrospinal fluid, the clear liquid in which the brain "floats" inside the skull. After testing the samples' tocopherol levels, he pairs the data with other information, such as whether the individual suffered from any form of dementia and whether their brain was populated with the plaques and tangles characteristic of Alzheimer's.



IN HER OWN WORDS

Hear Sister Adrian Schmidt tell her story at interactive.omrf.org

Although preliminary, Hensley's results have been promising. "So far, we have found decreased levels of two key tocopherols in cerebrospinal fluid from Alzheimer's patients." If his theory about the protective properties of these vitamins proves correct, tocopherol supplements could prove a powerful weapon in the fight to keep the aging brain healthy.

THE RELIGIOUS ORDERS AND NUN STUDIES will, no doubt, have many legacies. But perhaps the greatest contribution will be a seemingly paradoxical epiphany: that two brains that look alike don't necessarily function alike.

As scientists examined study participants' brains, they found numerous samples that were shot through with the physiological earmarks of Alzheimer's disease. But when they consulted the subjects' medical records and cognitive testing data, they discovered that many of those with the "sickest" brains did not exhibit any signs of memory loss in life. In other words, says OMRF President Steve Prescott, "just because a brain bears the telltale indicators of Alzheimer's doesn't mean that its owner suffered from dementia."

To explain this perplexing result, scientists developed a theory to explain the brain's ability to maintain function in the face of physical deterioration. They called this quality "cognitive reserve."

As they pored over the data they'd gathered from the studies, they realized that certain behaviors correlated with maintaining brain function. Keeping physically and intellectually active, maintaining a large social network, minimizing psychological distress—all of these correlated with lower rates of dementia and memory loss. Conversely, disease risk increased for study participants who were isolated and mentally and physically inactive.

"The idea that Alzheimer's was more than something physical that happened to the brain, that was a remarkable insight," says Prescott. And from that insight came the best news of all—that we may have the power to protect our minds from memory loss.

BECAUSE THE BRAIN is still such a mystery, the science of the mind remains intertwined with philosophy. Where do our thoughts come from? Do we control the chemical reactions that occur in the brain, or do they control us? These questions could just as easily be posed in seminary as in a graduate course in neuroscience.

For researchers like Hensley, there is a special kinship with the nuns, priests and brothers who have made his work possible. "Scientists and clergy lead such similar lives," he says. Both exist in worlds marked by solitude and dedication, where long periods of searching are sustained by belief and, occasionally, rewarded with epiphanies. "Science is a tool, the same as religion is a tool, for us to discover the meaning of the universe," says Hensley.

Papers strewn across his desk, he rubs his eyes and looks again at the flood of numbers and symbols running down the pages. What does it mean? How does it fit together?

Alzheimer's will not yield its secrets easily. But thanks to Sister Adrian, Sister Ellen and so many other holy men and women, Hensley can continue to work to crack its code. And one day, he may succeed. In the meantime, he will have faith.

Whither the White Lab Coat?

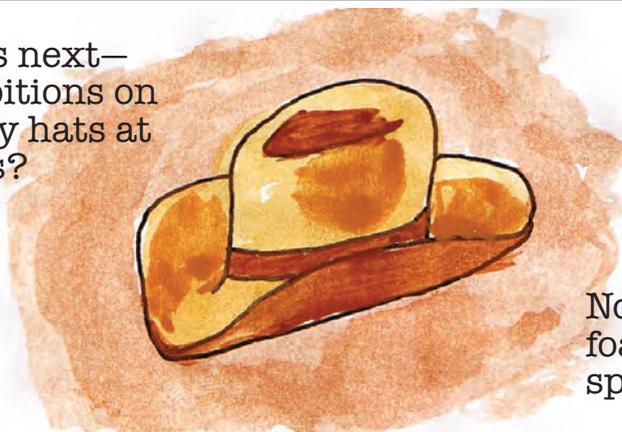
Ah, the white lab coat.

Trust me, it says.



Indeed, you'd be hard-pressed to find a more universally recognized symbol of research and medicine than the knee-length, multi-pocketed garment. But earlier this year, the American Medical Association considered whether hospitals should ban this iconic garb.

What's next—prohibitions on cowboy hats at rodeos?



No more giant foam fingers at sporting events?



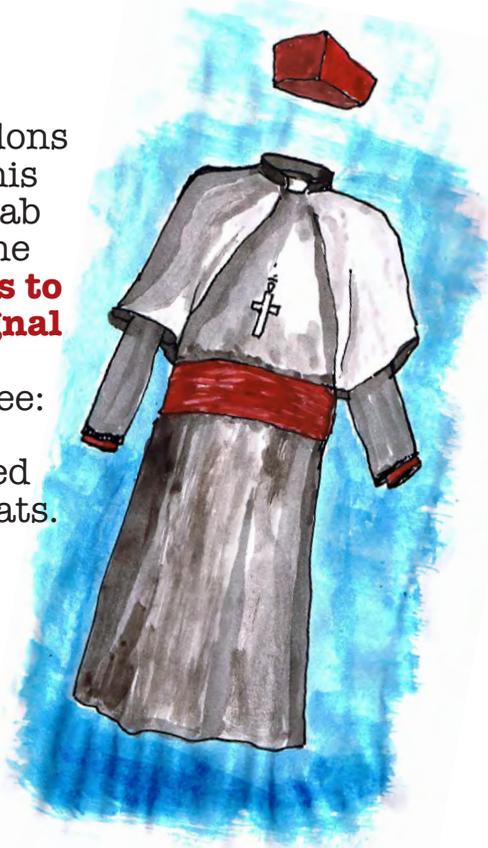
Still, the debate is no laughing matter. Proponents of the ban cited evidence that the coats harbor potentially harmful bacteria and contribute to the spread of hospital-borne infections, which kill nearly 100,000 U.S. patients each year. They urged hospitals to adopt a "bare below the elbows" dress code to avoid carrying bacteria between patients via coat sleeves.

“Anything can contribute to the spread of infection, and lab coats are no exception,” says OMRF microbiologist Dr. Philip Silverman. “For instance, if the coats aren’t buttoned down, the sides are likely to swipe walls, doors and other surfaces laden with microbes as doctors run from patient to patient.”



Ironically, hospitals introduced the lab coat in the 19th century to help prevent the spread of contamination. The idea came from scientific laboratories, where researchers had long donned the coats. But if you poke your head into a lab at OMRF today, you’re much more likely to spot an Abercrombie and Fitch tee than a white coat.

Nevertheless, says Silverman (who usually dons a flannel or polo shirt in his OMRF lab), don’t expect lab coats to disappear anytime soon. **“They’re analogous to a priest’s robes; both signal power,”** says Silverman. And patients seem to agree: In a survey, 56 percent indicated that they wanted their physicians in lab coats.



The AMA apparently had no appetite for defrocking, as it tabled the issue for further study. So, at least for the time being, we don’t have to find a new term to describe that elevated blood pressure most of us experience when we go to the doctor. We can just keep calling it “white coat hypertension.” ▣

Going With the Flow

DR. MARGARET CLARKE, OMRF MICROBIOLOGIST

I grew up in Enid, but I didn't start kayaking until I was a grad student at UC-Berkeley in the late 1960s.

In those days, you built your own boat in your garage from a mold with fiberglass and resin.

If you hit a rock, you'd probably break your boat. So it was important to carry duct tape.

I learned how to roll a boat and how to right it in a swimming pool in Oakland. Then it was on to rivers. Northern California is full of rivers that are a lot of fun.

You can't overpower the river. The key is to let the water do what it wants to do. Go with the flow.

In competition, I rowed mixed pairs. Wild water.

We were one of four pairs chosen to represent the U.S. at the 1974 international confederation competition in Yugoslavia. We didn't win, but it was a real adventure.

The East Germans were in a class all by themselves.

In 1976, we won the U.S. national championships.

Shortly after, I took a job in New York. So that was the end of competitive boating for me.

I was the second woman to kayak the Colorado River through the Grand Canyon.

It would be fun to do again. But you have to take your time to see the wonders of geology and the layers of geological history in the canyon walls.

What we considered extreme wouldn't be called extreme today. We weren't trying to run rivers where a mistake was likely to be fatal. That's common now.

Being out on the river is a wonderful, head-clearing thing.

When you get it working right, it's like you're a porpoise or a seal.

Nothing I've ever done was more fun than that. ☐



“Boating demands 100 percent of your focus in the same way science does.”





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SNAPSHOT

This redhead's no stranger to Oklahoma. On September 18, he was on the road again—this time to Oklahoma City, where he performed a birthday concert for OMRF board member Gene Rainbolt. Proceeds from the one-night-only event went to support OMRF cancer research. Can you name this outlaw? If so, your name will be in a drawing for a free OMRF t-shirt. Send your answer to findings@omrf.org or call 405-271-7213 to enter.