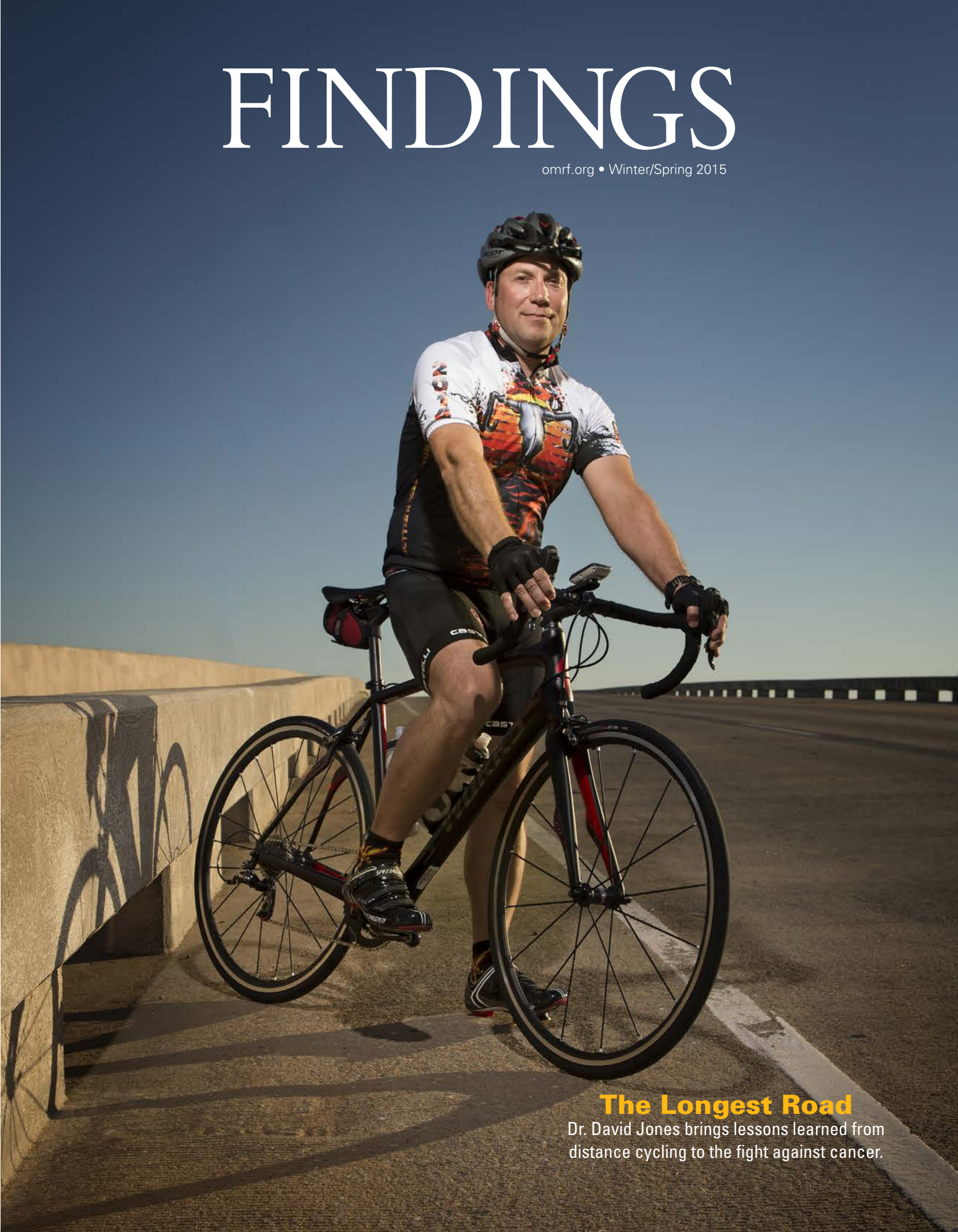
FINDINGS

omrf.org • Winter/Spring 2015



The Longest Road

Dr. David Jones brings lessons learned from distance cycling to the fight against cancer.

IT'S TIME FOR YOU TO CHOOSE

- ☐ Cancer
- ☐ Heart Disease and Stroke
- ☐ MS, Lupus and Autoimmune Disorders
- ☐ Alzheimer's and Diseases of Aging
- ☐ Where it's needed most

At the Oklahoma Medical Research Foundation, we want to hear from you. **By telling us how to use your gift, you're telling us what's important to you.** And the more we know, the better we can serve you in the battle against human disease.

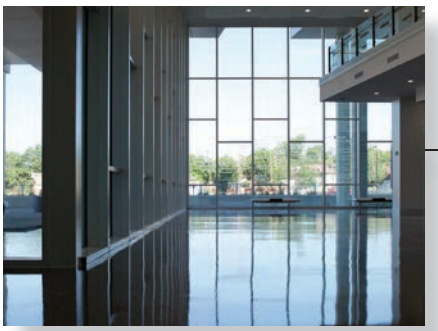
OMRF

825 NE 13th Street
Oklahoma City, OK 73104
405-271-7400 • omrf.org

YOUR SUPPORT MAKES A DIFFERENCE

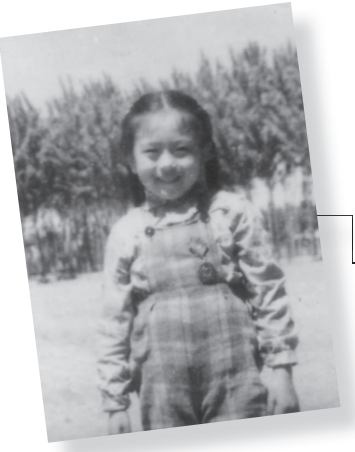
FINDINGS

Winter/Spring 2015



COVER STORY

405-271-8537 • 800-522-0211
findings@omrf.org



OMRF

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

SOARING TO NEW HEIGHTS

OMRF'S RESEARCH TOWER WINS INTERNATIONAL DESIGN AWARD

FROM ITS NATURAL LIGHTING to its native landscaping, OMRF's eight-story research tower showcases an array of attractive and useful green features.

"Plain and simple, we made our design decisions based on our commitment to maintaining a healthy environment," says OMRF's Executive Vice President and Chief Operating Officer Mike D. "Chip" Morgan. "The awards are just icing on the cake."

The tower's most recent accolade, the 2014 S-Lab Award for best new research laboratory, was presented at the "Supporting World Class Science" conference at King's College in London. More than 350 participants from across Europe, Asia and the U.S. attended the event.

OMRF's tower was selected from a pool of more than 30 entries from around the world for its innovative design and environmentally friendly features.

"We are thrilled to receive this recognition from our international peers," says Morgan, who accepted the award and presented a keynote address to the group. "We hope that our experience will assist them in the future, not just for expansion's sake but also for advances in medical research worldwide."

With years of experience in building and renovating laboratory spaces, Morgan meticulously scrutinized every detail through the design and construction phases. Large, open lab areas with moveable cabinetry allow researchers to reconfigure their space without added renovation costs and with virtually no downtime.

The building's design allows sunlight to penetrate each floor, providing abundant natural light and reducing lighting needs. Motion-activated light switches throughout the building also help keep usage to a minimum, and a state-of-the-art HVAC system with chilled beam technology reduces the energy needed for heating and cooling.

Why go to so much trouble, like using wood from replenished forests, instead of less-expensive options?

It's the right thing to do, says Morgan.

"Our research tower has provided us with new research and clinical space, but it also stands as a testament to OMRF's dedication to creating a healthier environment for our community," says Morgan.

"BETTER HEALTH IS OUR MISSION. WE TOOK THAT TO HEART THROUGHOUT THE DESIGN PROCESS."

CHIP MORGAN

CHAKRAVARTY COMES FULL CIRCLE

OMRF PHYSICIAN-SCIENTIST RECEIVES NATIONAL LUPUS AWARD

AS A JOHNS HOPKINS UNIVERSITY medical student, Eliza Chakravarty heard the name Mary Betty Stevens on a near-daily basis. Although she never met Stevens, Chakravarty's professors often spoke of their late colleague with great respect and deep admiration.

Decades later, Stevens' name is again shaping the OMRF physician-scientist's career.

In November, Chakravarty received the Mary Betty Stevens Young Investigator Prize, awarded annually by the Lupus Foundation of America to a researcher in the early stages of his or her career who has produced extraordinary achievements in lupus research. Chakravarty accepted the honor at the American College of Rheumatology Annual Scientific Meeting in Boston.

"I remember all of my professors instructing me with, 'As Mary Betty used to teach us,' or 'As Mary Betty would have said,' and, because of that, I always felt like I knew her," says Chakravarty, an associate member in OMRF's Arthritis and Clinical Immunology Research Program. "She definitely influenced the early part of my career in rheumatology, and to receive this honor in her name is just surreal. It really came full circle for me."

Chakravarty was selected for the recognition largely for her work on the immunological response to pregnancy outcomes among women with lupus.

Her research focuses on developing a better understanding of why autoimmune diseases can behave so differently during pregnancy. She and her colleagues tailor treatments for the risks in each individual pregnancy.

"It is important that we recognize the valuable contributions these investigators are making to advances in lupus," says Sandra C. Raymond, president and CEO of the Lupus Foundation of America. "Their achievements highlight the benefits that come from investment in medical research."

A Baltimore native, Chakravarty joined OMRF in 2011 after spending 11 years as a rheumatology fellow and faculty member at the Stanford University School of Medicine. OMRF offered an opportunity to work directly with patients in the clinic, says Chakravarty, which provided her with the chance to research issues on a case-by-case basis.

> "DR. CHAKRAVARTY HAS MADE PIVOTAL CONTRIBUTIONS TO UNDERSTANDING THE CHALLENGES LUPUS PATIENTS FACE IN HAVING HEALTHY CHILDREN."

"Dr. Chakravarty has made pivotal contributions to understanding the challenges lupus patients face in having healthy children and is actively exploring ways to improve lupus pregnancy outcomes," says Dr. Judith James, who chairs OMRF's Arthritis and Clinical Immunology Research Program and recruited Dr. Chakravarty to OMRF. "She has made major discoveries in the safety and effectiveness of vaccinations in patients with lupus, rheumatoid arthritis and other related autoimmune diseases. She is clearly a rising star in lupus research and is a wonderful addition to the productive, comprehensive lupus investigative team we've built at OMRF."

Talk About a Revolution

DNA SEQUENCING TECHNOLOGY IS MOVING MEDICAL RESEARCH FORWARD BY LEAPS AND BOUNDS

PUTTING A MAN ON THE MOON was a pretty big deal. Ditto for splitting the atom. But in the eyes of biologists, both of these scientific milestones pale in comparison to a more recent landmark: the sequencing of the human genome.

Scientists first produced a complete map of the genome (the technical term for all of the genes in our body) in 2003. That map, a sort of reference guide to the generic human, consisted of roughly three billion base pairs, the four chemicals that make up DNA.

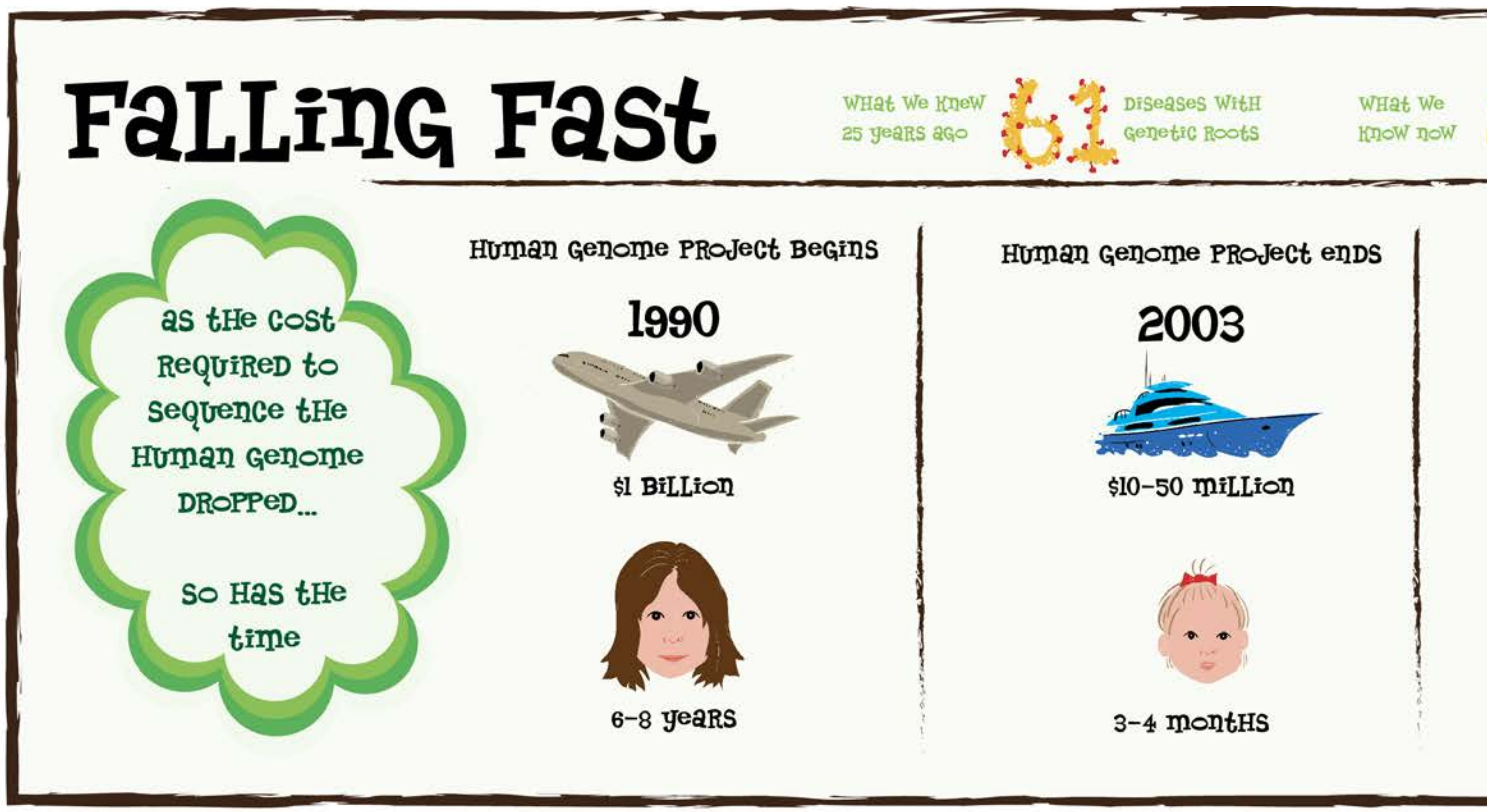
Over the next decade, researchers significantly refined that DNA blueprint with data gathered from sequencing the genomes of hundreds of thousands of additional subjects.

Using second-, third- and fourth-generation technology that has drastically reduced the price and time required to map out an individual's DNA (see graphic below), medical research centers like OMRF now routinely complete a scan of a person's entire genetic code in less than 48 hours. And while decoding the genome has yet to produce the wave of new drugs that scientists initially envisioned, it has yielded a steady drumbeat of success stories.

At OMRF, those successes include genome-wide association studies that have expanded the understanding of genes associated with two autoimmune diseases, lupus and Sjögren's syndrome. And led by Dr. Patrick Gaffney, OMRF scientists have identified the genetic roots of Adams-Oliver syndrome, a congenital disorder with only 100 or so cases ever documented in the medical literature.

"This technology has basically turned the field of diagnosing rare genetic syndromes on its ear," says Gaffney, who holds the J.G. Puterbaugh Chair in Medical Research at OMRF. "We now have the ability to identify specific mutations that cause genetic diseases. We just couldn't do that in the past."

Within the next year, health experts predict that at least 100,000 Americans will undergo some level of genetic testing. Most of these tests look at specific regions of the DNA for mutations that researchers have linked to certain diseases. But, cautions Gaffney, the

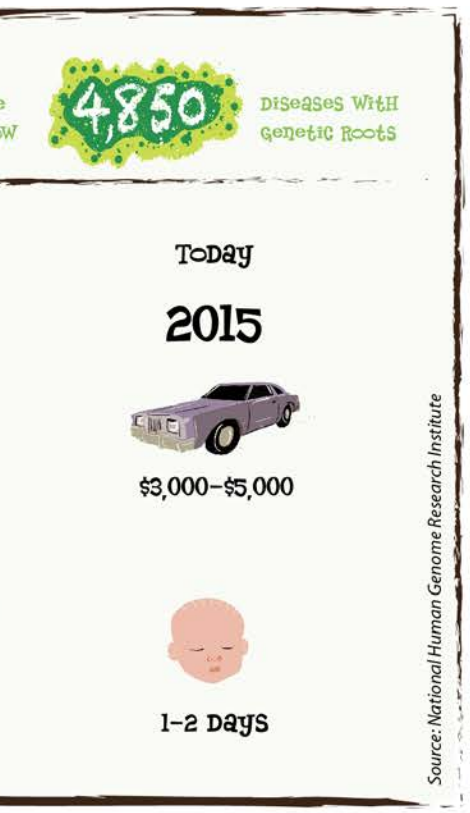


results that come back are often difficult to interpret and can yield far more questions than answers. "It's important for people to have genetic counseling both before and after these tests are administered so they understand the real meaning of the results they receive."

In the public health arena, researchers are now using genetic sequencing data to rapidly pinpoint the origins of the outbreaks of contagious diseases like Ebola and influenza. They're also employing DNA sequencing to understand what drugs a particular patient might—or might not—respond to in certain diseases.

For example, by analyzing the DNA found in a cancer patient's tumor, physicians can select a specific targeted therapy based on that person's genetic profile. "This is precision medicine," says Gaffney. "And it's only a matter of time before we're doing the same thing in conditions like diabetes and heart disease."

"WE NOW HAVE THE ABILITY TO IDENTIFY SPECIFIC MUTATIONS THAT CAUSE GENETIC DISEASE. WE JUST COULDN'T DO THAT IN THE PAST."



DNA DECODER
With next-generation sequencing technology, Dr. Patrick Gaffney and his research team at OMRF can map out a person's entire genome in less than 48 hours.

Think It's Chilly Outside? IT'S EVEN COLDER IN HERE

WELCOME TO OMRF'S BIOREPOSITORY, OKLAHOMA'S VERY OWN NORTH POLE

PARKAS, HEAVY-DUTY GLOVES and boots. It's not the standard uniform for scientists. But for the researchers who staff OMRF's ultra-cold biorepository, every day is much like a trip to the Arctic Circle.

OMRF built the facility in 2011 to house more than 1 million biological samples gathered from research subjects over the past three decades. With temperatures as low as -80 degrees Celsius (that's -112 degrees Fahrenheit), the biorepository—one of the largest of its kind in the U.S.—guarantees that scientists will have access to the samples for generations to come.

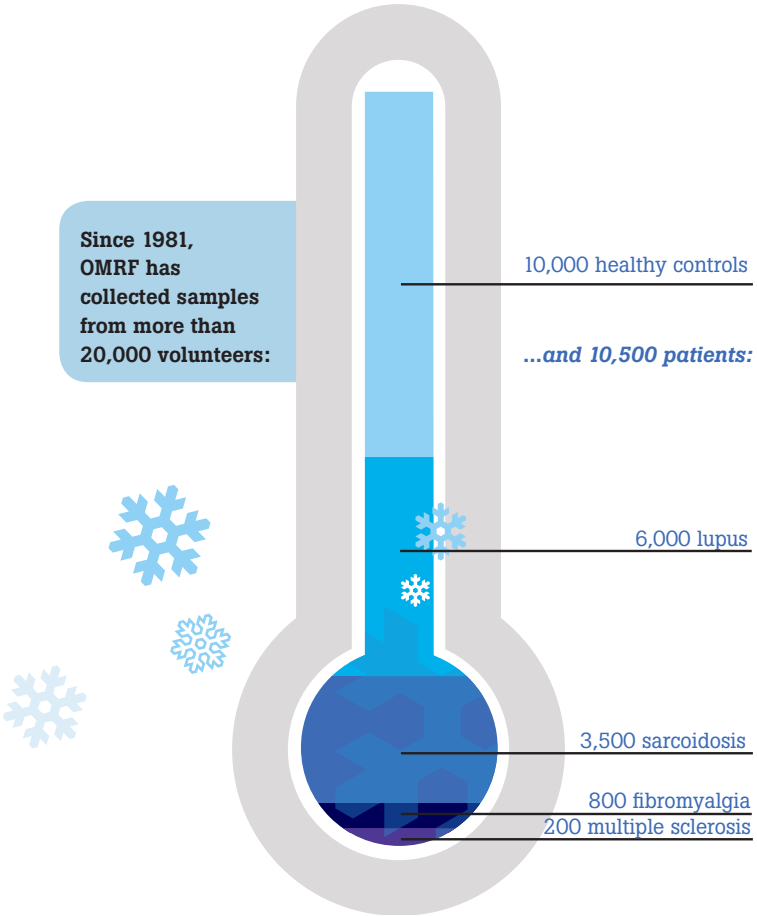
"This deep freeze is vital to research at OMRF," says Dr. Joel Guthridge, who serves as director of the core facility where the biorepository is housed. "Whenever a scientist does large-scale DNA testing to find genes that relate to a disease like lupus or heart disease, they need samples from donors. In order to keep those samples in the best possible condition for testing, we divide them up into small quantities and keep them very, very cold."

Because the integrity of the samples is so important, the biorepository has a three-layer backup, including an emergency system that uses liquid nitrogen in case of a total loss of electricity.

Workers cannot stay in the freezer for more than 10 minutes at a time, lest they develop frostbite, hypothermia or other health issues from the extreme cold. To ensure employee safety, Guthridge says, they rely on the buddy system. "Two people go into the freezer while a third waits outside. If something happens, they can press an alarm to alert us they need help. Timers also ensure no one stays inside too long."

At full capacity, there's space for another 4 million samples. OMRF is continuing to gather those from healthy controls and patient volunteers who come to OMRF clinics while also seeking additional samples from other clinics and pharmaceutical partners. "Our aim," says Guthridge, "is to build a resource that researchers around the world can use to answer some of our most challenging medical questions."

DEEP FREEZE
In OMRF's biorepository, workers like Jeanette Osban don gear worthy of an Arctic expedition, including heavy coats, gloves and protective face shields.



Wheat Belly?

My grocery store now has an entire section devoted to gluten-free foods. As I watch the number of products increasing, it makes me wonder: Do I need to worry about the gluten in my diet?

-Janet Puckett, Edmond

Short answer
Probably not, unless you have celiac disease

Long Answer

Gluten is a protein found in wheat, barley and rye. For the vast majority of people, gluten causes no problem whatsoever and is safe to eat.

But for a very small percentage of people with a condition known as celiac disease, ingesting gluten can cause an abnormal immune system reaction and trigger a wide range of physical problems. In the worst cases, it can be deadly.

Celiac disease damages the small intestine and can interfere with absorption of nutrients, leaving a person malnourished no matter how much food they eat. In children, it can result in a condition physicians call "failure to thrive."

At OMRF, scientists are comparing DNA samples from patients with celiac disease to those with other autoimmune conditions like lupus and rheumatoid arthritis, where something causes the body to begin attacking itself. Researchers have found that the diseases may share some common genetic roots with celiac, and they're collecting samples to find more genetic links.

For now, the only treatment for celiac disease is a gluten-free diet. So should we all eliminate gluten from our diets? If you're in the vast majority of people who feel no ill effects from ingesting wheat, rye or barley, the answer is no. If you suspect health problems with gluten consumption, talk to your doctor or try eliminating gluten from your diet to see if your symptoms subside.

If you experience fairly quick relief, then gluten may be your enemy. For the rest of us, there's no need to avoid the bread aisle.

KEEPING UP WITH THE JONES

BY ADAM COHEN
PHOTOS BY BRETT DEERING

How do you take on the most lethal disease the world has ever known?

FOR the

e new head of OMRF's cancer research program, it's just like riding a bike. >>

Dave Jones has a flat.

He pumps the handbrakes, bringing his bicycle—a sleek, black number—to a stop and hops off. His bike shoes clatter against the asphalt. Above him, the setting sun paints the sky the color of watermelon flesh. But Jones doesn't seem to notice. He's removed the front wheel from the bike and laid out a small collection of tools from a bag mounted beneath the seat.

"Cancer research has a lot in common with bicycling," he says, using a wedge the size of a Swiss Army knife to pry the tire free of the rim. "Both require perseverance. And dedication." The new chair of OMRF's Immunobiology and Cancer Research Program fishes the deflated tube from inside the tire. "You also have to be willing to fail."

Jones runs his fingers along the inside of the rim, searching for anything sharp—a thorn, a shard of glass, a pebble—that might still lurk within. "When there's a problem, you're constantly tinkering, trying to figure out what went wrong." Satisfied that whatever popped the last tube is gone, he whips out a replacement from the bag and threads it into the tire. "And if you don't have a plan for how to get going again, you're in trouble."

He expertly screws a silver cartridge into a tiny, pistol-shaped head, then clamps the head onto the tube's valve. A sharp hiss escapes as carbon dioxide rushes from the cartridge into the new tube, reinflating the tire. A moment later, Jones has stowed his tools and remounted the tire on his bike. The whole process took less than four minutes.

"A mechanic can do this in half the time it just took me," he says, clicking his shoes into the pedals. "But I'm getting faster." He's planning on a big ride in the hills of eastern Oklahoma in a few days. So tonight will just serve as an easy, get-the-blood-flowing ride.

He pumps his legs rhythmically, and the bike picks up speed. The shores of Oklahoma City's Lake Hefner fly by at 15, 16 and, finally, 18 miles per hour. "You have to believe that by changing one more thing you can improve." It's not clear whether Jones is talking about biking. Or cancer research. Or both. "You always have to look for that one thing. The thing that will make the difference."

>> Jones didn't set out to be a cancer researcher. But even before he knew what science was, he felt its pull.

As a five-year-old, he caught crawfish and minnows in buckets at the beach, then spent hours observing the small creatures' habits. He soon grew old enough to take a rubber canoe to explore the waters of Lake Huron, which laps up against his hometown of Alpena, Mich. But once Jones got out on the water, he would stop paddling and stretch himself out on the bottom of the boat. For hours at a time, the wind and waves would carry the ghost canoe while its lone occupant lay hidden from sight, studying the lake's aquatic life by pressing his face against a clear plastic window in the vessel's floor.

He dressed up as a scientist during career day in fourth grade; "I had a friend whose dad was a pharmacist, and he loaned me his lab coat," recalls Jones. He excelled in chemistry as a high-schooler. But it wasn't until he turned 20 that he opted to wear a white coat more regularly. As a junior at the University of Michigan, he took a part-time job in a laboratory, "distilling poisons from samples of environmental waters." He loved the problem-solving, the process of using a set of principles to find answers where others might see only chaos. Although his parents urged him to go to medical school, he decided to pursue a Ph.D.

In the pharmacology program at the University of Colorado, Jones studied blood clotting. In particular, he worked with compounds that caused the blood to coagulate and ones that interfered with the process. When he finished his degree, he decided he'd pursue a post-doctoral fellowship at the University of Utah. That training experience, a rite of passage for young scientists who hope one day to lead their own laboratories, would mark two important milestones for Jones. "It was the first time I thought about

my work in the context of cancer," he says. And it introduced him to a scientist who would have a profound impact on his career: Dr. Stephen Prescott.

Working in Prescott's lab, Jones developed a method to clone cox-2, an enzyme that had emerged as a potential culprit in arthritis. The work, which Jones and Prescott published in the influential *Journal of Biological Chemistry,* represented the first time scientists had succeeded in replicating the human form of this enzyme. And it drew significant attention, as both drug companies and academic researchers were focusing their efforts on how blocking the action of cox-2 might lead to new treatments for arthritis and other inflammatory conditions. (This hypothesis would turn out to be correct, leading to the development of cox-2-inhibiting painkillers Vioxx, Bextra and Celebrex.)

"Dave developed an incredibly clever way to tackle this difficult problem," says Prescott. "It was pretty clear that he was someone special."

While working with cox-2, Jones became intrigued by the possibility that blocking the enzyme might also represent a potential treatment for colon cancer. Prescott tried to convince the young researcher that he should stay at the University of Utah, where the university offered him his own laboratory to continue his work as an independent scientist. But Jones had other ideas. "He decided that he wanted to go into a commercial environment," says Prescott. "He really wanted to work on finding new therapies."

In 1993, Jones took a job at the drug company Upjohn (which later became Pharmacia & Upjohn and, ultimately, Pfizer). Although he rose rapidly through the company's ranks and was, according to Prescott, "a superstar," Jones found himself consistently frustrated by the risk-averse corporate culture. "I realized that I did not have the appetite for group decisions," says Jones. "Groups can make mediocre decisions. They take the safe road. And the safe road is not the innovative one."

Meanwhile, after Jones had joined Upjohn, Prescott helped engineer the creation of the Huntsman Cancer Institute, a new center at the University of Utah. Prescott, who would become director of the institute, wanted to fill its labs with promising cancer researchers, and Jones fit the bill. At Upjohn, he'd worked on ways to exploit the naturally occurring process of cell death to kill off cancer cells. Unlike many industry researchers, though, Jones had continued to publish his work in peer-reviewed scientific journals. "Dave had become a star scientist," says Prescott. "And when he'd had enough of working for big pharma, we were lucky enough to recruit him back."

>>At Huntsman, Jones focused his efforts on understanding the role that a gene known as APC played in causing colon cancer. Although he spent his days in the laboratory, his regular interaction with people afflicted with the disease served as a constant reminder of what was at stake each time he donned his lab coat.

"Patients came to Huntsman for treatment, and we saw them all the time. They'd pull their oxygen tanks along to lunch in the cafeteria. On the elevator, you'd talk with people who looked like their lives hung in the balance."

Once, the center's founding donor, Jon Huntsman Sr., brought Jones to the bedside of a patient facing long odds of survival. "This was an 18-year-old kid," recalls Jones, "who'd just had a huge sarcoma removed from his femur." Huntsman told the teen, "Dr. Jones is going to save your life." But Jones knew that the tumor would almost certainly recur—and that there was nothing he could do to stop it. He felt helpless. "I just shook the young man's hand and tried to offer some words of encouragement."

Still, says Jones, the encounter underscored the hope that people invest in scientists who study a disease that claims a half-million lives in the U.S. each year. "When you tell people you're a cancer researcher, the first thing they say is 'thank you.'" At an American Cancer Society Relay for Life workshop, Jones was asked to deliver the keynote address. "Before I could even open my mouth, the whole room gave me a standing ovation," he recalls. "They had no idea who I was. They just knew what I did." The gesture touched him deeply. "I had tears in my eyes. I choked up. I couldn't even get the first word out of my mouth.

"As a cancer researcher, you know that people are depending on you."

"As a cancer researcher," says Jones, "you know that people are depending on you. You feel highly valued." And that support helps balance out another inescapable truth, one that haunts Jones and his fellow cancer researchers: Despite decades of focused efforts and resources, many cancers remain incurable.

>> Jones believes that the path to a cure—or at least to more effective ways to treat cancer—leads, improbably, through a tiny, aquatic creature.

Named for the quintet of horizontal stripes that run along its body, a zebrafish grows to no more than an inch or two in length. But what makes the fish special is how it manifests the effects of changes in its genes.

In humans and most other creatures, the process of linking a change in a specific gene to something that later happens in the body is extremely difficult. Take, for example, a baby born with a mutation in a particular gene.

Typically, many years pass before the effects of that mutation show themselves, say, through the growth of a precancerous polyp on the wall of the colon. But even if doctors detect that polyp (through a procedure like a colonoscopy), they can't say what, exactly, caused the growth. Perhaps it was the mutation in question. Or maybe it was one of the countless other mutations that each of us carries in our genomes. So-called environmental factors, like what a person eats or the chemicals to which he or she is exposed, could also have been responsible. Or perhaps the polyp resulted from a combination of all of these genetic and environmental factors.

Zebrafish make a handy tool for a researcher who, like Jones, understands how to alter their genetic makeup.

In zebrafish, things work much more simply. When a gene is mutated in a fish embryo, any results can reveal themselves in just five days. This makes the fast-growing creature quite a handy tool for a researcher who, like Jones, understands how to alter its genetic makeup. If scientists change a gene and then observe some sort of developmental abnormality, they know that the mutation was responsible for the condition.

Surprisingly, zebrafish share a substantial number of genes with humans. One of these genes is APC, which scientists had implicated as a potential culprit in colon cancer. Jones and his team figured out a way to remove this gene in zebrafish, and when they did, something most peculiar happened: The fish failed to grow jaws.

At first glance, the development didn't appear particularly promising. After all, what did a missing mandible have to do with colon cancer? But then one of Jones' graduate students found research showing that zebrafish also failed to grow jaws when they were deprived of vitamin A.

Jones suspected that colon cancer tumors proliferated, at least in part, because they lacked the ability to generate retinoic acid, a derivative of vitamin A. So, he wondered, "What would happen if we gave retinoic acid to the zebrafish who lacked APC genes?"

The answer, Jones and his team soon discovered, was that the fish grew jaws.

When the scientists then treated samples taken from human colon cancer patients with retinoic acid, they found that it inhibited the proliferation of tumor cells.

The work would prove a watershed for Jones. First, it led to the publication of numerous research studies in *Cell*, the *Journal of Biological Chemistry* and other influential scientific journals, which in turn helped establish Jones as a national leader in cancer biology. Second, it taught him that using the zebrafish as an experimental model could offer a more efficient way to zero in on complex problems of human biology. Finally, it introduced Jones to a concept that now guides his work: translational research.

You see, once he found that giving retinoic acid to the fish took care of their jaw problems, he could "translate" that work to fixing the linked human problem. Those findings ultimately led to clinical trials of four compounds to treat colon cancer patients. "All thanks to a fish," he says. For someone who'd spent his boyhood peering into the depths of Lake Huron through the window of his inflatable canoe, it seemed somehow appropriate.

>> Jones began cycling in earnest a few years ago. But like so many other things he's taken an interest in—distance running, fly fishing, bird hunting, cooking, raising Weimeraners—this would prove to be no casual hobby. "Dave is a perfectionist," says Prescott. "And that's not a switch that just gets flipped off when he leaves the lab."

Jones scoured training plans on the Internet until he found one to his liking. Ever the scientist gathering data, he used a variety of tools to gauge his daily effort level. Following each workout, he'd upload a torrent of information, things like heartbeats and pedal strokes per minute, distance traveled, average speed, net elevation gain, and power statistics. He made steady progress, so he set a goal: to complete a 100-mile ride in under five hours. To average 20 miles per hour for five hours, though, would be no easy feat.

Jones cranked up his training to a weekly regimen of 150 to 180 miles, incorporating a mix of hard workouts and long efforts. With a busy schedule consisting not only of extensive time in the lab but also responsibilities as a husband (he and his wife, Ann, will celebrate their 24th anniversary in 2015) and father (of Claire, 18, and Ivan, 14), he ended up squeezing in a good deal of his riding in the wee hours before sunrise.

In August, after more than two years of preparation, Jones put his training to the test at the Hotter 'N Hell Hundred in Wichita Falls, Tex. True to its name, the ride proved to be a sizzler, with temperatures reaching 103 degrees. To make the conditions even more challenging, winds gusted to speeds of nearly 30 miles per hour.

In spite of the weather, Jones held pace for more than 80 miles. "Actually," he says, "I rode with a group that averaged 23 miles per hour up until the 85-mile mark." But, unaccustomed to biking in a large, tightly bunched pack of riders, Jones hesitated to drink much during the first four hours of the race for fear of crashing. That left him overheated and dehydrated. When the pack turned into a stiff headwind for the final 15 miles, Jones "bonked," and the pack left him and his goal of a five-hour finish far behind.

Still, Jones refused to be discouraged. He promptly went out and bought a CamelBak hydration system—"You suck the water out of a tube, so it's much easier to keep control of your bike"—and resumed training. He also decided to hire a coach. "The first thing he told me after reviewing my workouts," says Jones, "was that I was training too hard." Under his coach's tutelage, Jones dialed back his efforts, balancing hard workouts with easier recovery rides.

He now has his sites set on 2015's Hotter 'N Hell. "Last year was an experiment, and I failed," he says. "But I'm not giving up. No way."

>> Around the time Jones got serious about biking, he got an email from his former mentor. Steve Prescott had left Huntsman years before to become president of the Oklahoma Medical Research Foundation. Jones and he had periodically kept in touch over the years, but when Prescott sent a casual "How's it going?" type of message to Jones in 2012, he got a response from his one-time protégé that he did not expect. Jones, who had then risen to become co-chair of Huntsman's Department of Oncological Sciences, told Prescott that he was contemplating leaving Huntsman—and Utah.

As it turned out, the timing couldn't have worked out better for OMRF. For three decades, the foundation had focused its cancer research on the development of the human immune system. Under the leadership of Dr. Paul Kincade, OMRF scientists had made important strides in understanding how errors in this process led to cancers such as leukemias and lymphomas. But Kincade had made the decision to leave the lab to become the foundation's vice president of research, so Prescott was searching for someone to take the reins of OMRF's cancer research efforts.

To build his team at OMRF, Jones began by recruiting a pair of emerging stars in breast cancer research: Drs. Bryan and Alana Welm.

What's more, OMRF had just entered into a partnership with the University of Oklahoma's Peggy and Charles Stephenson Cancer Center. With funds provided by the Oklahoma Tobacco Settlement Endowment Trust, Stephenson would help OMRF bring talented new cancer researchers to the state. "The heart and soul of any cancer center is research," says Stephenson Director Dr. Robert Mannel. "Our goal is to take the knowledge scientists obtain in the lab on cell and animal models and start applying it to human cancer patients." Jones' work, which had used fish to identify new strategies for treating human colon cancer patients, fit this vision to a tee. Plus, says Mannel, "Dave also brought an outstanding leadership pedigree."

In 2013, Jones left Huntsman to join OMRF as the new leader of the foundation's Immunobiology and Cancer Research Program and the first holder of the Jeannine Tuttle Rainbolt Endowed Chair in Cancer Research. He also agreed to serve as Stephenson's associate director for translational research. It's that bridge between two worlds—OMRF's labs and the clinics at Stephenson—that helped Jones make the decision to leave Utah for Oklahoma. "For the work we do to be meaningful, we need to find physicians who are interested in thinking about clinical trials," he says. "OMRF's partnership with Stephenson makes that possible."

At OMRF, he not only established his own laboratory but created a new resource for use by all foundation scientists: a zebrafish core facility. With a start-of-the-art filtration system and hundreds of tanks full of thousands of fish, Jones will help other scientists at OMRF study problems that reach well beyond cancer.

For example, OMRF's Dr. Jonathan Wren is working to understand the so-called "third third" of the human genome. "Scientists have characterized about two-thirds of the genes in our genome," says Jones. "But we still don't know what those final 8,000 or so genes do." His plan: Delete a big group of those unknown genes one at a time in the fish and study what happens. Jones also wants to use the fish to investigate other genes that OMRF researchers have identified as candidates for causing various diseases. "If we could give people a clue what the functions of some of those genes are, that would be huge."

Dr. Linda Thompson, who's been a researcher in OMRF's Immunobiology and Cancer Research Program for 25 years and holds the Putnam City Schools Distinguished Chair in Cancer Research, has already been impressed with Jones' leadership. "He has a grand vision for our department. He believes in personalized medicine for cancer care, in tailoring cancer care to individual patients. And he's gone out and recruited some very smart people to help execute this vision."

Indeed, this past summer, with the support of the Stephenson Cancer Center, Jones successfully recruited Drs. Bryan and Alana Welm to OMRF from—you guessed it—the Huntsman Cancer Institute. The Welms' research focuses on breast cancer, with an emphasis on how researchers can help physicians deliver the optimal care to each individual patient.

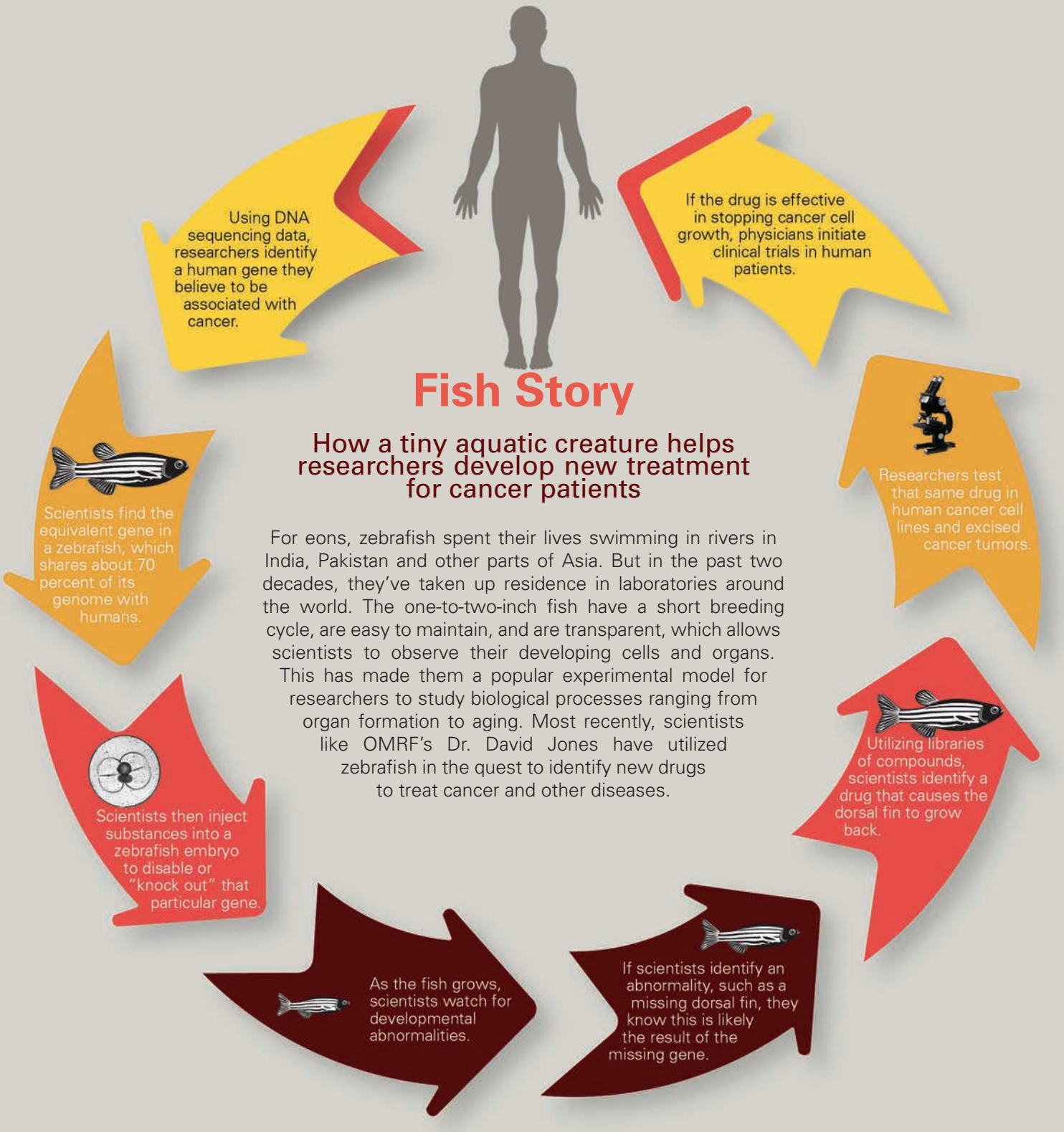
Jones says the key to recruiting the couple, whom he calls "superstars," was trust. "When I recruit people, I tell them that if you come here, I'm going to do everything I can to help you succeed. I told Alana and Bryan that when I recruited them to Huntsman." So when he told them he'd do the same at OMRF, they decided to make the leap.

"Dave is a fantastic scientist and a fantastic leader," says Alana Welm. "He's the reason we're here."

Although the OMRF cancer research team now consists of 10 principal researchers. Jones intends to continue expanding the group. "We want to keep adding talented scientists who can complement the skills we have—people with outstanding scientific aptitude who think creatively, work collaboratively and can tackle the hard problems."

Looking ahead, Jones knows that the OMRF cancer research program will focus on the twin concepts of precision cancer care and transforming discoveries into therapeutic advances that help cancer patients. But as for specifics, those will come in time. Science, after all, is all about serendipity, about discovering the unexpected.

And, Jones says, about making a difference. "The constant vision is to do outstanding science. That work should be impactful, both on the scientific community and on human health."



Fish Story

How a tiny aquatic creature helps researchers develop new treatment for cancer patients

For eons, zebrafish spent their lives swimming in rivers in India, Pakistan and other parts of Asia. But in the past two decades, they've taken up residence in laboratories around the world. The one-to-two-inch fish have a short breeding cycle, are easy to maintain, and are transparent, which allows scientists to observe their developing cells and organs. This has made them a popular experimental model for researchers to study biological processes ranging from organ formation to aging. Most recently, scientists like OMRF's Dr. David Jones have utilized zebrafish in the quest to identify new drugs to treat cancer and other diseases.

"Our work should be impactful, both on the scientific community and on human health. I feel like it's a personal battle."

For much of his career, he admits, the drive to make meaningful discoveries, "was passionate, but not emotional." But that changed when his wife, Ann, was found to have a genetic mutation that causes colon cancer. It's a mutation that both his children may also be carrying.

"Now," Jones says, "I feel like it's a personal battle."

>> On his bike, at least on this particular night at Lake Hefner, there is no battle to be fought. Just a father, clearing his head and his lungs while his son, a freshman at Bishop McGuinness High School, practices soccer nearby.

Darkness begins to descend, and Jones and his bike head north from Lake Hefner to a quilt of green fields where gaggles of kids chase after black-and-white balls. Jones circles the fields, milking an extra half-mile or so out of the workout. He hops his bike over a final speed bump in a swift, confident motion, then dismounts.

"On the surface, biking and cancer research are both individual sports," he says, pulling his helmet off to reveal a black bandana wrapped around his head. "But in reality, they're team sports." He removes the water bottle from his bike and takes a long drink. "Take the Tour de France. Eight people with different specialties—sprinting, climbing, time trials—ride so that one person can win."

The last licks of sunlight pour forth from the west, silhouetting Jones as he swallows another mouthful of water. "To be successful in cancer research, it's exactly the same. You need to assemble a team of specialists to succeed. Then you have to have a plan."

He wheels his bike around back of his SUV and lifts it onto a carrier that's secured to the rear of his black Nissan. "But even when you have a plan, it's not always going to be easy to execute. There will be setbacks. And that's where perseverance comes in."

Tomorrow morning will bring another ride. And then another day in the lab. The experiment he's working on may produce a startling new insight into cancer. Or it may be a dud. "We're going to fail sometimes."

But, in the end, he says, solving cancer's mysteries is a lot like biking. "You have to stick with it in those moments of doubt. And we will."

HIGH PLAINS GIVER

BY RYAN STEWART

Wilma McElmurry quietly saved r

Things don't change much in Custer County. To passersby, Clinton, Okla., is little more than an Interstate 40 pit stop with an affinity for Red Tornado football and the fall harvest. But there is more to this town of 9,000 than pigskin and wheat.

It's a hard-working community that thrives on the values of generations past: Respect your elders, lend a hand to those in need and appreciate the value of a dollar.

For lifelong county resident Wilma McElmurry, those values forged a way of life. They also laid the foundation for a generous and unexpected gift that would touch OMRF and medical research in Oklahoma for generations to come.

Born in 1915 on her family's farm in nearby Custer City, McElmurry was raised to embody the civic selflessness that permeates western Oklahoma.

An only child, McElmurry graduated from Independence High School in 1933 on the heels of the Great Depression. After earning a degree from Southwestern Oklahoma State University in Weatherford in 1940, she spent 33 years as a schoolteacher, first in Arapaho, then in Clinton. While at Arapaho, she married fellow teacher Bonnie McElmurry.

Ask anyone who knew Wilma McElmurry to describe her, and you'll inevitably hear words like frugal and thrifty.

McElmurry's wardrobe was disproportionately comprised of free shirts and hats she collected from local promotions. She even wore a watch that cost her $1. And if something couldn't be acquired for free, she shopped almost exclusively at Goodwill, dollar stores and garage sales, never splurging on herself.

"She was kind of a legend that way," says C.B. Graft, her lifelong friend and family lawyer of 36 years.

Although she drove a battle-tested car and lived in a small, nondescript home, McElmurry had actually done quite well for herself financially, thanks to an inheritance in the 1980s, as well as oil and natural gas holdings. Still, Graft says, she carefully guarded her money, which she kept in accounts

McELMURRY FARM
The windswept acres where Wilma McElmurry spent most of her adult life stand just as they did when she died in 2005.

millions—and then left it all to charity

at more than a dozen different banks spread throughout western Oklahoma.

According to Graft, his client listened to advice from close friends, but she always made her own decisions. "She was the type of person who was fiercely independent," he says.

Following Bonnie's death in 1996, McElmurry made her first donation to OMRF in his name, and she continued to give annually until she died nine years later. Upon her passing, she donated her entire estate to the causes she held closest to her heart: medical research and education. But the size of her donation shocked even those who knew her well.

McElmurry had set up a $5 million charitable trust for three nonprofit beneficiaries: Clinton Public Schools, Southwestern Oklahoma State University and OMRF.

McElmurry had lost her father to cancer, and her mother died of a heart attack. So she earmarked half of the trust's payments to fund research on cancer and heart disease at OMRF. As a result, her trust provides at least $60,000 each year to study the diseases that claimed the lives of her parents.

At OMRF, scientists study the genesis of cancer and heart disease and work toward developing more accurate diagnostics, treatments and possible cures for the diseases. McElmurry's gift even helped fund a clinical trial for a compound discovered at OMRF that has shown promise for treating a lethal form of brain cancer called glioblastoma.

Estate gifts provide approximately $2 million each year to fund research at OMRF, says Ginny Bass Carl, OMRF senior director of development. "We average about a dozen key estate gifts each year. Not all are the size of Wilma McElmurry's, but each is important and gives OMRF the flexibility to fund key research areas."

For McElmurry, giving to medical research ensured she would positively impact the health of future generations. And that had no price tag. "She felt like OMRF was a charitable organization that would do the most with her funds," Graft says.

7 Things You Didn't Know about

Dr. Xiao-Hong Sun

As a child growing up during China's Cultural Revolution, Xiao-Hong Sun's world turned upside down when the government sent her parents to the countryside to work the land. Meanwhile, young Xiao-Hong was forced to stay behind with her grandmother in Beijing. Following high school, the government assigned her a job as a laboratory technician. But Sun continued to educate herself, slipping quietly into the back of college classrooms, soaking up knowledge like a sponge. She scored so well on an entrance exam for a China-U.S. exchange program that she entered graduate school at Cornell University in Ithaca, N.Y., never having officially enrolled in college as an undergraduate. Thirty years later, she holds the Lew and Myra Ward Chair in Biomedical Research at OMRF and studies the role of Notch, a protein important to the development of cancer.

1.

I was separated from my parents for more than a decade. The government thought sending scholars like them (they were both physicians and professors) to work in rural areas would "reform" them.

My childhood was so different from an American childhood. I had no control over my future. It was like living during a war but without guns. Life was on hold.

> In third grade, we would have three or four hours of school in the morning and then go to the fields to work. We walked behind the wheat harvesters, picking up the leftovers.

When I first came to the U.S., another student and I arrived at the airport in the middle of the night—and in the wrong town. An airport worker was kind enough to drive us to Ithaca.

Once I began at Cornell, I realized that if I couldn't do science, why bother to live? I learned quickly that the lab is where I'm happiest.

My mother still lives in Beijing. I try to visit her as often as I can.

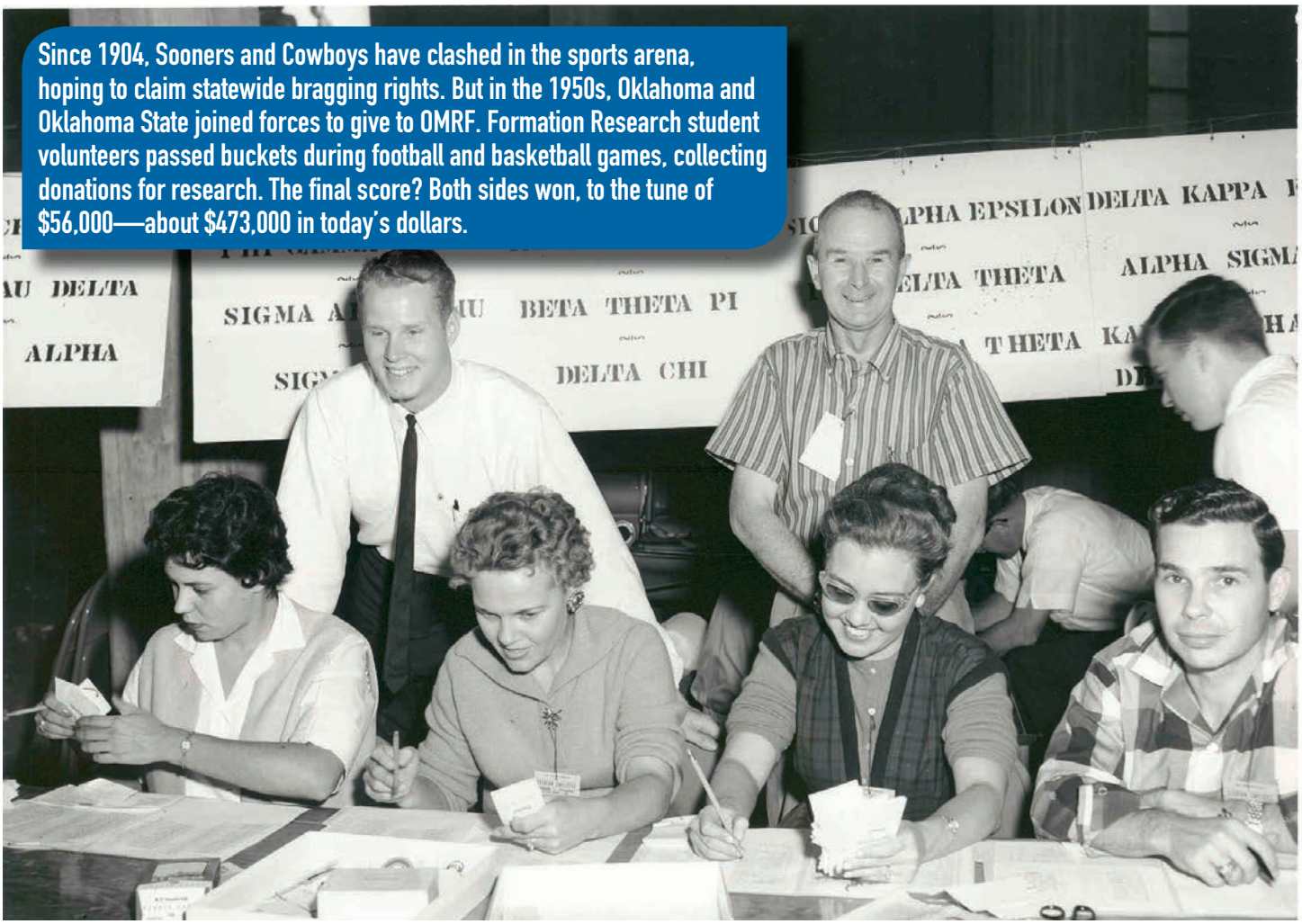
My father died just after I finished high school. I think he would be very happy to see where I am today. He would be very proud.

7.

OMRF
825 N.E. 13th Street
Oklahoma City, OK 73104

Non-Profit Org
U.S. Postage
PAID
Permit No 639
Oklahoma City, OK

Bedlam Buddies



Since 1904, Sooners and Cowboys have clashed in the sports arena, hoping to claim statewide bragging rights. But in the 1950s, Oklahoma and Oklahoma State joined forces to give to OMRF. Formation Research student volunteers passed buckets during football and basketball games, collecting donations for research. The final score? Both sides won, to the tune of $56,000—about $473,000 in today's dollars.