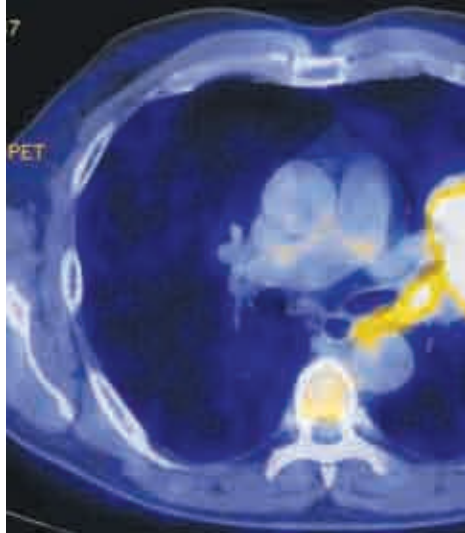
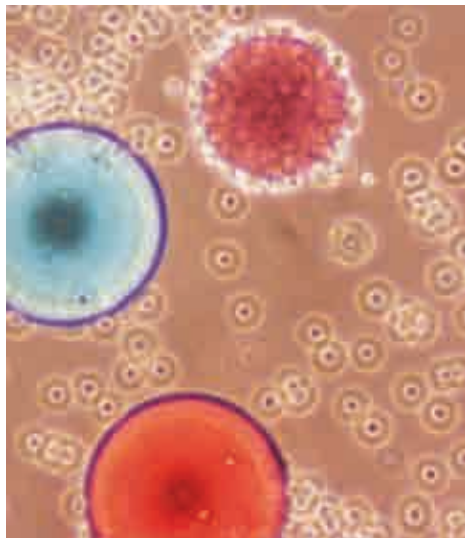
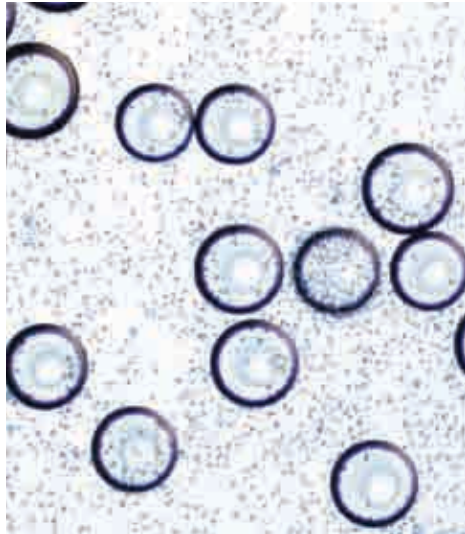




BREAKING BARRIERS TO BEAT CANCER

UCDAVIS
COMPREHENSIVE
CANCER CENTER



UC Davis gains national recognition for comprehensive cancer care

BY ANNA BARELA

UC Davis' cancer center is one of more than 6,000 cancer centers in the country. What sets UC Davis apart from the rest—the reason it is different and special—is collaboration. Doctors, specialists and research scientists collaborate across departments and disciplines, breaking barriers to bring personalized and leading-edge treatments for each individual patient.

The National Cancer Institute (NCI) is recognizing this world-class, collaborative care as it bestows upon the cancer program at UC Davis the coveted designation of “comprehensive cancer center.” NCI, the federal government's principal agency for cancer research, assesses cancer research organizations based on scientific excellence and diversity of research approaches, creating networks to help people find the best care.

“If you come here for care, you're getting the best care in the world.”

A NCI-designated cancer center since 2002, this new designation places UC Davis in an exclusive group of only 41 comprehensive centers in the country. To qualify as comprehensive, UC Davis meets strict criteria set forth by the NCI.

“It is the most stringent criteria anywhere in the world,” cancer center director Ralph deVere White said. “What comprehensiveness ultimately means is that a group of people spend their whole life assessing how we can better deal with cancer. Sacramento has one of the world's best cancer centers here to make every aspect of cancer better for our community and beyond.”

Among the criteria is a requirement for broad research programs—and UC Davis continually breaks research barriers to improve cancer care. It boasts 180 research scientists who contribute to a better

understanding of cancer, affecting patients at UC Davis and beyond in the constant search for a cure. Not necessarily one cure for all cancer—cancer is complicated and there are many different kinds—but many cures for many types of cancer.

“We've done a very good job finding cancers early and treating them early so those people don't go on to get advanced cancer and die,” deVere White said. “We have done a great job of increasing quality of life and making a better experience.”

“Despite this,” he continued, “650,000 Americans died last year from cancer. We are going to have to tackle the more advanced cancers. We are going to have to find new and better treatments.”

Every day, research scientists in the basic science spectrum provide a base for understanding how to better treat cancer, down to the DNA. Biomedical technology programs harness the power of technological advances to improve the treatment experience and outcomes for patients. And breakthrough drug therapies are being discovered, with the help of genetically engineered mice, fast enough to pinpoint the perfect drug for individual patients.

Research and the individual patient intersect at clinical trials. Here, new treatments are brought to patients as quickly as possible while ensuring safety. The patient becomes part of the research while benefiting from new treatments not available anywhere else.

The breakthroughs made at UC Davis benefit patients even beyond its walls. For example, UC Davis leads the Cancer Care Network in which doctors at community hospitals across the state discuss individual cancer cases with UC Davis specialists. Patients benefit from the expertise of all the doctors and all the research behind them.

And to ensure no one gets left behind, UC Davis engages in education and outreach, removing the barriers to potentially life-saving cancer care and screening that certain ethnic groups disproportionately lack. UC Davis wants to ensure all groups have equal access to care.



RALPH DEVERE WHITE

According to deVere White, benefits to the greater community don't stop there. He envisions citywide clinical trials in the future. He also knows that many doctors and scientists train at UC Davis and—after forging new ideas that inspire and challenge seasoned faculty—go on to bring the skills and expertise garnered at UC Davis to other hospitals around the region, the state, the country and even the world.

“We see ourselves as a resource for the region,” deVere White said. “And if you come here for care, you're getting the best care in the world.”

From the lab to the patient to the greater community, research and informed care at UC Davis covers the broad spectrum expected by NCI for a comprehensive cancer center. And gaining this designation will serve to benefit UC Davis and its patients as NCI awards new infrastructure grants. It also opens doors to new research funding only available to comprehensive cancer centers. With the complexity of research involved in fighting cancer, new funds are desperately needed and will be put

to good use through continued growth.

“Our job over the next five years is to make sure that we can show that we have affected the process from all levels of cancer,” deVere White said. “We are adding knowledge. That knowledge will come first to the people of Sacramento then to the region. We can expect to then go out and add to the world's knowledge to control this disease.”

In celebration of its new NCI comprehensive designation, the center will soon have a new sign on its building: UC Davis Comprehensive Cancer Center. It will serve as a beacon of hope to the community and beyond knowing they are working tirelessly—sometimes around the clock—breaking barriers to beat cancer.

And even if they don't cure all cancer tomorrow, their work may cure one person's cancer today. If you are that person—or your family member is that person—one is enough to make it all worthwhile.



Collaborating to cure cancer

BY KENDALL FIELDS

WOLF-DIETRICH HEYER

The complexities of cancer make basic scientific research valuable on the path to advancing treatments and finding a cure. In order to treat cancer and practice preventive medicine, doctors and scientists must first understand it, said Wolf-Dietrich Heyer, a professor of microbiology and molecular and cellular biology and co-leader of UC Davis Comprehensive Cancer Center's Molecular Oncology Program.

Together with Hongwu Chen, professor of molecular medicine, Heyer leads a group of 34 researchers in the basic science program at the cancer center. Basic science research benefits patients by providing a base for doctors—and other scientists—to better understand cancer and improve treatments in the future.

"The 21st century is the century of biology," Heyer said, adding that he and his team work to develop ways to apply their knowledge and incorporate biology into cancer treatment.

Heyer's own research focuses on DNA repair and making cancer cells more susceptible to treatment.

"Cancer is, in essence, a genetic disease, and the cells accumulate mutations," Heyer said. "The key is discovering why these mutations are happening."

Several members of the Molecular Oncology Program are studying how DNA is maintained and accurately segregated to daughter cells to prevent mutations.

In 2010, Heyer, his colleague Stephen Kowalczykowski, and their teams made a breakthrough in their research when they purified BRCA2, a protein that is a determining factor in breast and ovarian cancers. The teams' isolation and purification of this large protein allowed them to begin studying how it functions.

"Any kind of drug treatment or intervention requires that you understand the target, so this was a huge leap in that direction," Heyer said.

BRCA2 normally prevents mutations, and patients have significantly greater risks for breast and ovarian cancer when they lose the BRCA2 protein. The deficiency of this protein also determines how patients respond to certain treatments. The teams are continuing their studies and working to understand this important tumor suppressor.

"The 21st century is the century of biology."

According to Heyer, basic science translates into clinical science. The projects in the program are often developed because of work with physicians, who ask basic scientists like himself to find ways to improve treatment or gain a better understanding "from the bench to the bedside ... And there are many examples where the work in the clinic sends people back to the bench."

For Heyer, this collaboration and balance between basic science and clinical science are key to the cancer center's success. Their integration allows people to move ideas forward.

"The goal of the cancer center is to provide a focus and bring together a group of people and unite to fight," Heyer said.

The Molecular Oncology Program is an amalgam of scientists with backgrounds ranging from physics to chemistry to biology.

Scientists also get to shadow doctors in the clinic. This "bridging the gap" between basic science and clinical science would not be possible without an infrastructure like the cancer center. And with its new designation as a comprehensive cancer center come new opportunities to grow.

A large effort to bring together clinicians and basic scientists is ongoing. Heyer said the aim of this program is to apply all of the techniques and knowledge of his program to the tumors of actual patients in an effort to directly impact patients with positive results.

Heyer, who remembers when the cancer center received its first NCI award and became a designated cancer center 10 years ago, is thrilled that it is now being recognized as a comprehensive center.

"The designation as a comprehensive cancer center is obviously a recognition that the cancer center is doing it right and that we are on the right track. It puts the cancer center in a select group of centers in the country," Heyer said. "And what it acknowledges also is the very significant educational efforts that we have."

He credits the success and accomplishments of the center to the leadership of Ralph deVere White and Hsing-Jien Kung, professor of biological chemistry and deputy director of cancer center basic science, and their ability to bring people in and get them intellectually excited by providing them with the right environment and fostering collaboration.

"There would be no future if [the cancer center] did not exist, no hope for fundamental improvements," Heyer said.

BECOMING YOUR OWN ADVOCATE

BY KENDALL FIELDS

Laura Tyrell had always been active and maintained a healthy diet, never imagining that one day she would be diagnosed with cancer. But in October 2000, doctors told her she had breast cancer.

"I was in shock because I never thought that was something that would happen to me," she said.

Thinking of her husband and three children who were 18, 15 and 9, Tyrell recalled asking herself, "What will this mean for my family?"

For 11 years following the initial diagnosis, Tyrell, who lives in Roseville, also suffered ovarian and peritoneal cancer. She chose to have a mastectomy to treat the breast cancer and underwent chemotherapy. Chemotherapy frightened her because of the horror stories she had heard from other patients, but she found that she was able to manage the side effects of hair loss and nausea. She credits her tolerable experience to new medical developments and targeted therapies.

Cancer made Tyrell realize there are no guarantees in life, and she should value the present. She cherishes every experience with her children.

Tyrell also learned to take control of her life and be her own advocate due to her experience with cancer.

"You can't sit back and let it happen to you," Tyrell said. "For me, that's how I cope—by being active in patient care and cancer prevention."

For the last six years, Tyrell has volunteered with the Placer Breast Cancer Endowment Fund, a volunteer-driven organization working to raise \$1.5 million for UC Davis Comprehensive Cancer Center in hopes that further developments in treatment and prevention will be made. Currently the organization has raised \$800,000. To help, visit www.wethinkpink.org.

Tyrell has been in remission for 13 months. "I pray everyday that it continues," she said.



Advances in technology improve cancer treatments

BY LINDA DUBOIS

Surgeons will be able to remove cancerous tumors without damaging surrounding tissue. A person will be able to take a strong cancer drug without side effects. Women at high risk for breast cancer will be screened far more effectively.

These are only a few of the potential results of technologies being developed by researchers in the Biomedical Technology Program at the UC Davis Comprehensive Cancer Center.

"Technology can impact cancer patients on many, many different levels," said Simon Cherry, professor of biomedical engineering and radiology. "We want better technologies to help diagnose cancer earlier, to help us assess the best treatment to give a particular patient, to improve the way that we treat patients and to improve the way we monitor whether or not the treatment is working."

Cherry added, "The goal of our program is to harness scientists at UC Davis who work to develop all kinds of technologies and computational tools, and get them interested in applying them to cancer detection and treatment."

These include scientists in physics, chemistry, engineering, computer science and mathematics. The program aims to link these scientists of various disciplines to the physicians and cancer biologists at the UC Davis Comprehensive Cancer Center.

One of the most important collaborative technologies is imaging. It's used to detect cancer at earlier stages, to see where the cancer has spread and to monitor if treatment is working.

Two scientists, in UC Davis Health System's Department of Radiology, John Boone, professor, and Ramsey Badawi, associate professor, have developed a three-dimensional imaging system for detecting and monitoring breast cancer treatment that is far more effective than a standard two-dimensional mammogram. Similar whole-body scanners already exist, but since this machine is built on a much smaller scale for an individual body part, it allows for a much higher definition image.

"We want better technologies to help diagnose cancer earlier."

The prototype is already being used in clinical trials.

Other promising research involves intraoperative diagnostics to help surgeons find the margins of tumors during surgery.

When a surgeon is removing a tumor, it's crucial to get all of the cancer out to prevent recurrence. So, as a precaution, it's common for the surgeon to take out a "wide margin" of tissue surrounding the tumor. However, sometimes this isn't desirable, such as in brain surgery.

Laura Marcu, professor of biomedical engineering and neurological surgery, leads a team developing an approach with "fluorescence lifetime" imaging that will allow the surgeon to accurately detect the edges of the tumor. Simply put, surgeons would shine laser light on the cancerous region and the tumors and healthy tissue would look different from each other.

"This is very important for all tumors," Marcu said. "But in particular for brain tumors or head and neck tumors because if you remove too much you can impair neurological function and the quality of life of the patient. This way, surgeons can differentiate between diseased cells and normal cells."

Similarly, cancer treatment would be much more effective and produce fewer side effects if drugs could be delivered only to the tumor.

Katherine Ferrara, professor of biomedical engineering, leads research on a project that delivers tiny capsules of a drug directly to a tumor, and then zaps the capsules with ultrasound to release the drug. She's also working on putting molecules on the outside of these particles to help make them stick to the tumor.

Another research area involves testing combinations of drugs, which are often used because one drug alone can't work on all aspects of a tumor. Alex Rezvin, associate professor in biomedical engineering, leads the development of a microfluidics device system, basically tiny wells that spray cancer drugs to test cancer cells with various combinations and amounts of drugs on a massive parallel scale. If combinations can be tested, the success rate soars and risk of side effects plummets.

These are only a few of the promising developments emerging from UC Davis Cancer Comprehensive Center's Biomedical Technology Program. And UC Davis is committed to applying these new developments to improve patient care.

"It doesn't help if we develop some great technology, publish it and then don't do anything with it," Cherry said. "Our ultimate goal is to get it out there somehow. Another important part of this program is to get the technology into the hands of the cancer researchers and the clinicians."



KATHERINE FERRARA

CREATING MORE COMFORTABLE CARE

BY LINDA DUBOIS

Nausea, hair loss, infertility and chronic pain. Anyone who has had to suffer these or any of the other notorious side effects of chemotherapy will appreciate the work of Katherine Ferrara, professor of biomedical engineering at UC Davis.

Among her team's many research projects are those designed to get powerful cancer drugs to attack cancer cells while leaving healthy cells alone. Researchers place the drug in a nano-sized capsule and then zap it with ultrasound to release the drug when reaches the tumor.

"I've always been interested in people and in medicine," Ferrara said.

Ferrara earned a bachelor's degree in physical therapy in 1976 from University of Pittsburgh while still a teenager. After working in that field, she earned bachelor's and master's degrees in electrical engineering in 1982 and 1983 from California State University, Sacramento, followed by a doctorate in the same field in 1989 from UC Davis.

While working on her doctorate, she was employed with General Electric's medical division, where she worked on imaging technologies for both cardiovascular disease and cancer. She eventually became a biomedical engineer, following in the footsteps of her father, Ralph Whittaker, one of the first biomedical engineers.

Ferrara's team of about 20 scientists collaborate with approximately 20 other medical professionals in various fields from UC Davis as well as other institutions around the world. Her skills and expertise, along with that of her teammates, result in more effective and comfortable care for patients at UC Davis Comprehensive Cancer Center.



SIMON CHERRY



New mouse brings breakthrough treatments

BY SUKHI K. BRAR

DAVID R. GANDARA

PATIENT FINDS HOPE AT UC DAVIS CANCER CENTER

BY SUKHI K. BRAR

Jane Coyne was diagnosed with lung cancer in August 2010 after undergoing a routine body scan. At the time, the cancer was already stage four and had spread to her brain. A non-smoker, Coyne was shocked.

The oncologist at the cancer center near Coyne's home in San Rafael gave her little hope for survival. He recommended chemotherapy but told her none of his previous patients in her condition had survived. Then a friend of a friend recommended David Gandara at UC Davis Comprehensive Cancer Center in Sacramento.

"Dr. Gandara arranged an emergency meeting with me within two days, and it was a different story when I saw him," Coyne said. "Dr. Gandara also recommended chemo, but he said they had all kinds of modalities for me. He said they would take a fingerprint of the tumor to target medicine for it. He had a whole plan for me. As soon as he got the test results back, he knew exactly what to give me."

With the right chemotherapy and radiation therapy, Gandara was able to bring Coyne into remission. Although new cancer in her lungs has shown up in a recent retest, Coyne has complete confidence Gandara will continue to help her as he brings her case into his lab to test on JAX mice.

"As the tumor progresses in the mice, they will be able to test drugs on those mice instead of me to see how my tumors will respond," Coyne said. "I just know that when [Gandara] gets all his data back, he will be able to get a plan for me."

Gandara and UC Davis Comprehensive Cancer Center have given Coyne the best hope for a cure.



Just about everyone knows someone who has been affected by cancer these days. Cancer treatments are known to be harsh on the body, and the effectiveness of any given medication is often hard to predict even by the most skilled oncologists because there are so many different cancers. It is not uncommon for a medicine that worked on one lung cancer patient to have no effect on other lung cancer patients. Finding the right treatment as soon as possible is crucial to survival.

What if doctors could use all of the known cancer medications on one patient at once to ensure the most effective treatment? Of course, this would be too harsh on a patient's body to be a viable treatment method. But a new group of doctors and scientists is coming close to finding a way to do something similar.

UC Davis Comprehensive Cancer Center, Jackson Laboratory (JAX) West and the National Cancer Institute (NCI) Center for Advanced Preclinical Research (CAPR) have joined forces to create an advanced system for testing medicines on lung cancers. JAX West is the Sacramento-based arm of the preeminent East Coast mammalian genetics institute, while NCI-CAPR has long supported top cancer research nationally. David R. Gandara is a UC Davis oncologist who serves as the overall director for this ground-breaking collaboration.

Before the partnership, testing on mice was one way scientists tried to trace the effectiveness of cancer drugs. Traditional tests involved injecting lab mice with human material such as genes that cause mice to develop cancer. Scientists then ran tests on these mice.

However, the mice develop "mouse cancer, not a human cancer," explained Gandara.

Regular mice cannot be injected with a human cancer cell because their immune systems would kill the cell. Unfortunately, 90 percent of the effective treatments for these mice don't work on humans.

UC Davis Comprehensive Cancer Center partner JAX has developed a new type of lab mouse with a new capability.

With these new mice, several treatments can be tested at once without hurting the patient.

"Instead of 'mouse cancers,' the JAX mice can grow human cancer cells in their bodies," Gandara explained. "These mice have been genetically engineered so that their immune systems do not reject human cancer cells. What we are talking about here is a whole organism that can mimic a person."

Gandara continued, "These mice must live in ventilated mouse caging for providing HEAP filtered air in the laboratory to protect them from exposure to germs and need the help of hundreds of lab personnel dressed in space suit-like uniforms to keep the mice alive. These mice would not be able to survive outside of the laboratory."

What makes these mice so valuable is

that one patient's cancer cells can be injected into many different mice, which are then each available for separate testing of a given medicine. Each patient's cancer is unique, and drugs that worked on someone else may not work on her particular cancer. With these new mice, several treatments can be tested at once without hurting the patient.

The process begins when an eligible patient at UC Davis Comprehensive Cancer Center agrees to participate in the program. Doctors take a sample of the cancer tumor from the patient for testing. These cancer cells are then injected into genetically engineered JAX mice that then grow the patient's cancer cells in their bodies.

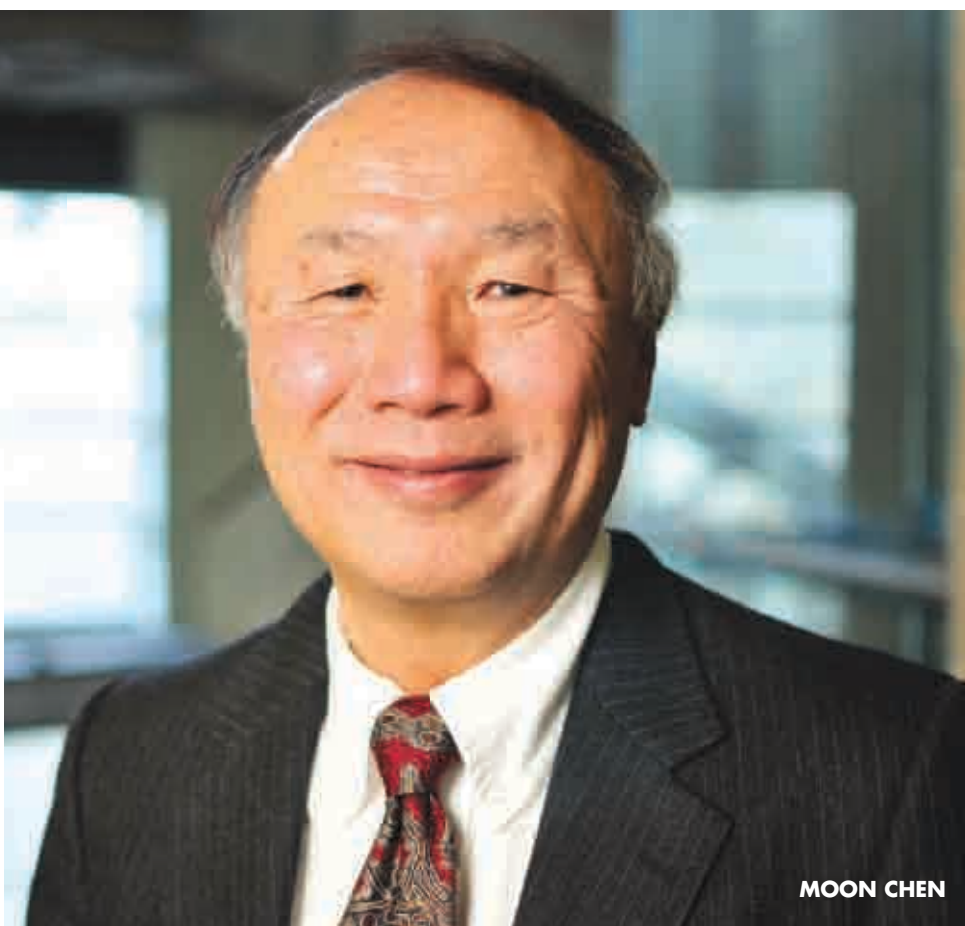
"You can treat it all at the same time 10 different ways," Gandara said. "Then study the genetics, you can see what happens with each different treatment. It gives you the ability to do something you can only do in a mouse, not the patient. We can then manage treatment for one patient, or thousands of patients like her."

Gandara believes this is the future of better treatments for cancer. The program began in 2009 and there are more than 250 patient cancers currently in the mice. About 65 of them are lung cancer.

"Right now this testing is a pilot study, but it is very exciting," Gandara said. "We are probably not going to cure cancer per se, but we are going to cure cancer one patient at a time. With individualized or personalized therapy, even finding something for one patient is like hitting a home run."

No one left behind

BY CORRIE PELC



MOON CHEN

Cancer does not discriminate; anyone can get it. However, not everybody has equal access to cancer prevention. Many ethnic groups experience cultural, historical, linguistic or environmental barriers to potentially life-saving screenings. Missing out on these screenings dramatically increases the likelihood of dying from certain types of cancer.

These barriers are called “cancer health disparities,” and the UC Davis Comprehensive Cancer Center is working hard to eliminate them.

Over the past six years, Marlene von Friederichs-Fitzwater, assistant professor of hematology and oncology and director of the Outreach Research and Education Program at UC Davis Comprehensive Cancer Center, has been working with Native American women to help eliminate the disparities they face in breast cancer prevention and care.

Native American women have the poorest mammography screening rate of any ethnic group. When these women are finally diagnosed, the cancers have progressed further and are less treatable. The result is higher death rates within five years of diagnosis.

Von Friederichs-Fitzwater began her work by building relationships with various Native American tribes and tribal leaders to form the UC Davis American Indian Advisory Council—a group of 12 women from different Native American tribes. The council developed the Mother’s Wisdom Breast Health Program, which uses an interactive DVD featuring Native American women talking about breast health and breast cancer.

The council piloted the breast health program with 160 Native American women and increased the mammogram screening rate

in this group from 47 percent to 97 percent, which von Friederichs-Fitzwater said was due to the intervention being developed by and for Native American women.

“It was their program, introduced to them in talking circles by other Native American women,” she said. “[Women] were shown the DVD first with a discussion and then given a copy to take home. It was hugely effective.”

“... potentially, we saved seven lives in the first year because these are women who said they would not have been screened.”

That success led to a three-year grant to expand the program to 1,000 Native American women in 25 tribes. Von Friederichs-Fitzwater said that of 292 women enrolled in year one, 7 percent had abnormal breast cancer screenings.

“So, potentially, we saved seven lives in the first year because these are women who said they would not have been screened,” she added.

Asian Americans also experience disparities when it comes to cancer, said Moon Chen, professor of hematology and oncology, principal investigator for the Asian American Network for Cancer Awareness, Research and Training (AANCART) and associate director for cancer control at

UC Davis Comprehensive Cancer Center. According to Chen, liver cancer in particular affects Asian Americans disproportionately and is typically associated with the hepatitis B virus—the second-largest risk factor for cancer after tobacco.

“In Sacramento, we are leading a national effort to figure out the most optimal ways to increase screenings for hepatitis B. Screening for hepatitis B is not a common screening procedure that physicians prescribe, yet this is a very important early detection test that we need to work on,” Chen explained.

Chen circulates information about hepatitis B screenings through Vietnamese-language radio, television and newspapers; through Korean churches that act as a social hub in their communities; and through bilingual, bicultural staff members who make home visits in the Hmong community with cancer-prevention messages.

UC Davis researchers are also working to eliminate disparities that both African Americans and Latinos experience with colon cancer. Using laptop computers in doctor’s office waiting rooms, the program delivers education on the importance of colon cancer screenings. Patients who browse the laptop while waiting are more likely to ask for a screening.

The program was so successful in Sacramento that the National Cancer Institute has implemented it in other parts of the United States.

Chen said, “We’re not only doing superb work here, but our superb work is being recognized as something that can address the nation’s cancer burden.”

TAKING ACTION TO ELIMINATE DISPARITIES

BY CORRIE PELC

Kellie Stevens, a member of the Nevada Paiute tribe, knows all too personally the effects of poor breast cancer screening rates in Native Americans—her aunt passed away from breast cancer just a few years ago. That’s why Stevens decided to take action and make sure other women in her community get screened.

Stevens, who works as finance secretary and account clerk for the California Rural Indian Health Board, helped found the UC Davis American Indian Advisory Council in 2005. Through her work on the council, she helps educate women about breast cancer screenings through the Mother’s Wisdom Breast Health Program. Additionally, Stevens designed the American Indian Ribbon of Life, which is a pink eagle feather design, to help raise awareness of breast cancer among Native American women.

Stevens said her lineage helps her communicate with other Native American women about the program.

“They open up more,” she explained. “They actually tell me some of their own stories of people in their families who had breast cancer, what wasn’t done, and why they think this is an important group that we have.”

Stevens said that before sitting on the council and becoming more educated about breast cancer, she would never have thought of having a mammogram.

“The way I was raised, my mom never spoke of certain things,” she said. “This is something she would never have spoken to us about, it’s like taboo. It makes me want to go out there and let other people know about it who have never had mammograms either.”



Sarcoma treatment barriers collapsing

BY MURRAY SHOHAT

When Jerrilee Griego found a large lump growing in her right thigh, she had no idea that a new clinical trial at UC Davis Comprehensive Cancer Center might make her one of the first sarcoma patients to dodge the disease's well-known ability to threaten life.

The trial blends leading-edge radiation and imaging technology with hands-on collaboration among the surgeon, radiation oncologist and pathologist—plus use of a powerful “targeting agent”—to halt or sharply reduce tumor spread.

Although rare compared to carcinoma, which causes 10,000 to 20,000 new cancer cases per year in the United States, metastatic soft-tissue sarcoma can be difficult to eradicate, according to Robert Canter, the trial's lead investigator and assistant professor of surgery at UC Davis.

“Sarcoma strikes every age group but hits younger patients, even children, more frequently,” Canter said. “Many types—there are over 50—can be very aggressive, a devastating diagnosis, especially for the young.”

A five-year survival rate for the most aggressive sarcomas is only around 50 percent.

Thirty years ago, sarcomas growing in an arm or leg were often treated by amputation. Aggressive sarcomas in the neck, head, trunk and abdomen were death sentences because microscopic tumor cells quickly metastasized into life-threatening tumors elsewhere in the body.

Although radiation oncology to halt metastasis and surgery to remove the mass have dramatically improved since, the

medical approach was and still is “to do everything possible.” This can be harsh on the patient.

“Our new goal is personalized therapy to overcome the barriers we've faced,” Canter said. “In our trial, we've individualized treatment. Our team approach maximizes outcomes while sparing patients from as much toxicity and overtreatment as possible.”

Upon learning about the effects of chemotherapeutic drug Sorafenib, created by pharmaceutical giants Bayer and Onyx to destroy kidney and liver cancers, Canter took notice. Sorafenib tablets are administered orally, and in kidney cancers the drug cuts off a tumor's blood supply, killing the tumor. Canter sees patients with tumors as large as eight inches in diameter. Would Sorafenib have the same effect on sarcoma cells as it does on kidney tumor cells?

“We are seeing largely dead and shrunken tumors in surgery, thanks to the trial.”

“Our clinical trial is answering that question. The preliminary phase's result is a strong yes,” he said.

Patients undergo a multi-week outpatient process involving a daily dose of Sorafenib followed by a few minutes of precisely delivered gamma radiation five days a week. After several weeks of rest to recover from side effects like fatigue and skin rash, the patient undergoes tumor removal surgery.



ROBERT CANTER

“We are seeing largely dead and shrunken tumors in surgery, thanks to the trial,” Canter said.

Two adjunctive technologies help tailor each patient's pre-surgical therapy. First, a leading-edge MRI with dynamic contrast enhancement “allows us to picture the tumor's blood supply—and changes thereto—in real time,” Canter said. Patients undergo the noninvasive MRI when they first join the trial and several times during and after the trial.

Second, radiation oncologist Arta Monjabez, also an expert in sarcomas, performs daily gamma radiation. Gamma rays eradicate the tumor and other susceptible areas to reduce the risk of any viable cancer cells being left behind following surgery.

“We look at the amount of tumor necrosis (cell death) after the patient has had radiation,” Monjabez said. “Has necrosis been increased by the Sorafenib? Is the radiation working together with the drug? If true, and I believe it's true, there are two advantages: We stop tumor growth, a big advantage in immediate local control. We may also be able to stop the spread or metastasis of the tumor. This is the bigger, long-term advantage.”

The phase II trial, due to start soon, will include up to 30 patients and involve other regional cancer centers.

“The goal is to validate the efficacy of co-treatment using a tailored combination of Sorafenib, MRI and image-guided gamma radiation to prepare the patient for surgery,” Monjabez said.

For Griego, the treatment came from a dream team of collaborating specialists. She believes she is now cancer-free, something that many more sarcoma patients will soon be able to say as a result of this barrier-smashing clinical trial.

GREAT GRANDMOTHER IS GRATEFUL FOR CLINICAL TRIAL

BY MURRAY SHOHAT

In late 2010, Jerrilee Griego felt a lump in her right thigh. Born with a natural reluctance to complain, Griego waited a few weeks to see a doctor while the lump continued to grow.

Griego is your typical poster child for great-grandmoms. Married 57 years, she enjoys her two daughters, two grandchildren and two great grandchildren. She had no prior cancer history before the lump appeared.

“When I finally went to my doctor, it was pretty large, but it didn't hurt,” she said.

Her doctor immediately referred her to UC Davis Comprehensive Cancer Center where an MRI and biopsy confirmed soft-tissue sarcoma. Robert Canter, assistant professor of surgery, quickly recruited Griego into a clinical trial. Five times a week for five weeks, Griego and her husband made 80-mile round trips between their home in Diamond Springs and the cancer center. She took a single Sorafenib tablet daily and underwent a short session of gamma radiation therapy Monday through Friday.

Therapy ended just before Thanksgiving. Apart from mild soreness, Griego recalled some hair loss as the only other side effect. A month later, Canter operated to remove the tumor. The co-treatment of Sorafenib plus radiation made the tumor easier to remove while reducing chances for spreading. Six days after surgery, Griego returned to her life in Diamond Springs.

“I think the cancer is gone,” Griego said without hesitation.

Follow up involves an annual MRI plus “a CT scan of my lungs because if the sarcoma metastasizes, it'll be to the lungs.” Grateful to Canter and the radiation oncologist Arta Monjabez, Griego said she is not worried.



ARTA MONJABEZ



The National Cancer Institute's "Comprehensive Cancer Center" Designation

Meaning and significance for UC Davis Health System and Northern California

- The NCI's "comprehensive" designation has a **precise meaning**. Other cancer centers may describe their services and capabilities as "comprehensive," but UC Davis Comprehensive Cancer Center is *the only* cancer center in Sacramento and all of inland Northern California to have earned the NCI's "comprehensive" designation — the **world's most prestigious honor in oncology**.
- UC Davis Comprehensive Cancer Center provides **outstanding care** embedded in a **culture of discovery**. That means our successes in the laboratory, such as personalized treatments designed to target the specific molecular characteristics of tumors, can be delivered to the clinic when patients need them.
- The NCI's comprehensive designation for UC Davis Comprehensive Cancer Center certifies that **patients throughout inland Northern California** — including those in Truckee, Marysville, Pleasanton, Lodi and Merced within the UC Davis Cancer Care Network — have **access to world-class cancer care** close to home.
- The new designation attests that UC Davis Comprehensive Cancer Center is breaking barriers to beat cancer through investigator-initiated **clinical trials** of new therapies, **biomedical engineering research**, the translation of **innovations** from the lab to the clinic, **scientific partnerships** to develop better cancer research models and work to **close gaps** in cancer outcomes for different populations.
- The UC Davis Comprehensive Cancer Center draws on **experts at UC Davis and throughout the state** — more than half of its 180 members are faculty from such institutions as the UC Davis School of Veterinary Medicine, College of Agricultural and Environmental Sciences, School of Agriculture, Department of Biochemistry and Molecular Medicine, and College of Biological Sciences, as well as researchers from Lawrence Livermore National Laboratory, Jackson Laboratory and the California Department of Public Health.



"It's been eight years since my grim diagnosis. Why am I still here? It's pretty obvious. The treatments I have been receiving are prolonging my life. At UC Davis Cancer Center, I've had access to new drugs coming through the pipeline or just recently approved."

— ROLLIE SWINGLE

- The UC Davis Comprehensive Cancer Center has **joined an elite group** of other NCI-designated comprehensive cancer centers, including Mayo Clinic in Minnesota, M.D. Anderson in Texas and Memorial Sloan-Kettering in New York.
- UC Davis Medical Center in 2011 was ranked among **the top 50 hospitals for cancer** in the U.S. by *U.S. News and World Report*. Also in 2011, among *Sacramento Magazine's* 100 Best Doctors, 17 were physicians who treat cancer patients at UC Davis. And in January 2012, *PBS Newshour* featured UC Davis Comprehensive Cancer Center to illustrate advances made in the nation's 40-year war on cancer.
- UC Davis Comprehensive Cancer Center **bolsters the region's economy** by providing jobs, fueling research partnerships and entrepreneurship, and attracting leading medical and scientific talent.
- **Ninety-four cents** of every dollar donated to UC Davis Comprehensive Cancer Center is used to foster excellence in cancer research and cancer care, which **benefits patients** locally, regionally and nationally.

UC DAVIS
COMPREHENSIVE
CANCER CENTER

BREAKING BARRIERS TO BEAT CANCER