

ACT AGAINST CANCER

A publication of the University of Arizona Cancer Center | FALL 2018

Clinical Trials
turning molecules
into medications



THE UNIVERSITY
OF ARIZONA



THE UNIVERSITY OF ARIZONA
Cancer Center

ON THE COVER

The University of Arizona Cancer Center (UACC) scientist Joyce Schroeder, PhD, with donor Ginny L. Clements. Ms. Clements' support has helped propel Dr. Schroeder's research forward. (Photo by Kris Hanning, UAHS BioCommunications)

UACC is one of only 49 cancer centers in the nation, and the only cancer center with headquarters in Arizona, to earn the National Cancer Institute's Comprehensive Cancer Center designation, which demonstrates our scientific leadership, the breadth and depth of our research, and the spirit of collaboration we nurture among scientists. As a leader in the national dialogue on cancer, UACC is initiating rapid advances in research and patients' health.

EDITOR

Anna C. Christensen, MPH

PHOTOGRAPHY

**Kris Hanning, Tabbs Mosier,
Raina Ramirez**

GRAPHICS

Gaius J. Augustus

DESIGN

Debra Bowles

UAHS BioCommunications

SPECIAL THANKS

**Matt Peters, David Mogollón,
Alex Vergara**

uacc.arizona.edu



A NOTE TO OUR FRIENDS AND SUPPORTERS

At the University of Arizona Cancer Center, we are proud of our clinical trials, which give patients access to numerous cutting-edge drugs unavailable elsewhere in the community.

Clinical trials are a win-win — for participants, who receive vigilant and compassionate care, and for future patients, who benefit from past groundbreaking studies.

One type of clinical trial, essential for developing new therapies, is the investigator-initiated trial — often based on research originating from the laboratories of UA Cancer Center scientists, taken into the clinic by physicians driven to bring patient care to the next level. Our researchers attack unsolved problems in cancer care to advance potent cancer cures.

In these pages, you will meet a few of the UA Cancer Center members dedicated to giving options to patients who might not otherwise have them. A Tucson scientist is preparing to bring her drug into the clinic to learn if it will help patients with triple-negative breast cancer and inflammatory breast cancer — two forms of the disease with few treatment options. Another scientist in Tucson and a physician in Phoenix are building a bridge between our two cities with a trial to investigate post-radiation dry mouth in head-and-neck cancer survivors, another group of patients lacking effective treatments.

UA Cancer Center researchers also have been involved in milestone clinical trials, including several looking into selenium supplementation for its ability to prevent cancer.

With most U.S. adults taking vitamin or mineral supplements, research into their safety and effectiveness is of the utmost importance. We also are proud of the role our members have played in expanding scientific knowledge in this field.

We want to ensure that clinical trials are available to each and every person in the state of Arizona. Our members reach out to underserved populations to increase participation in clinical trials — efforts that are crucial in strengthening the validity of clinical trials overall.

All clinical trials go through multiple layers of scrutiny, with oversight provided by the Scientific Review Committee, the Clinical Research Oversight Council and institutional review boards, to name a few groups. The staff members on these committees are deeply committed to research ethics and patient safety.

Our goal to end cancer is an ambitious one, but with the commitment of each of our supporters, we can come together to make incredible strides. We are excited to share the stories of our researchers and their pioneering investigations.

Sincerely,

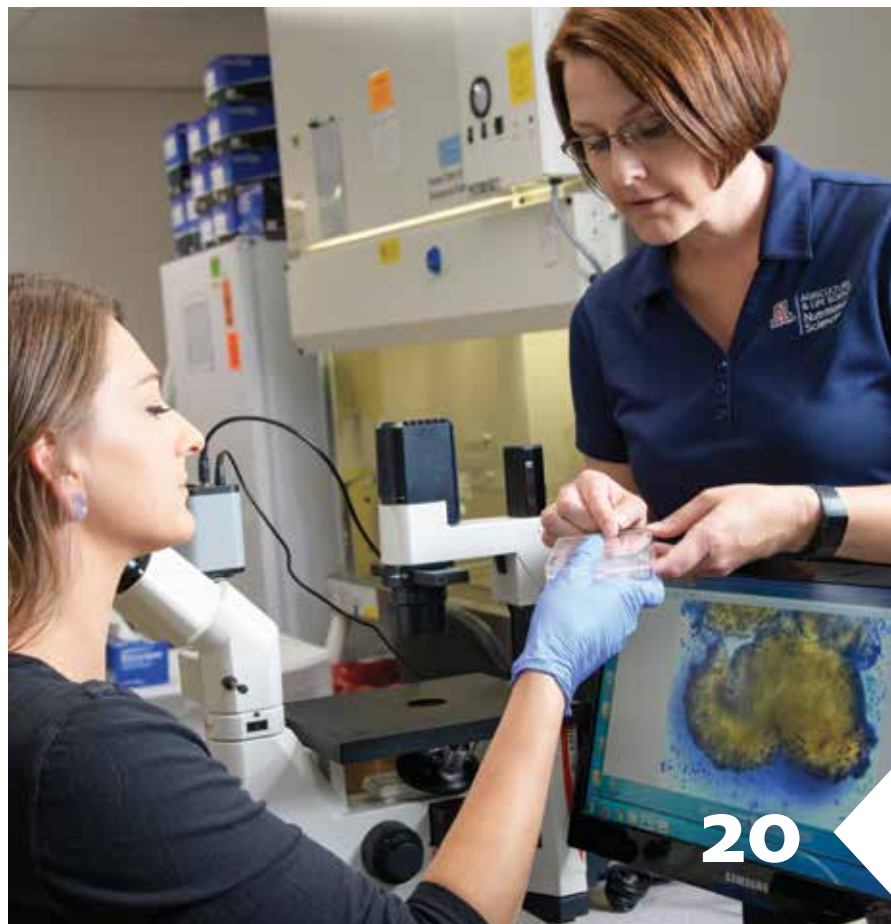
A handwritten signature in black ink that reads "Andrew S. Kraft".

Andrew S. Kraft, MD

*Sydney E. Salmon Endowed Chair
Director, University of Arizona Cancer Center
Associate Vice President, Oncology Programs, University of Arizona Health Sciences
Senior Associate Dean for Translational Research, UA College of Medicine – Tucson*

*"Medicine doesn't just fall out of the sky.
Without drug trials, we're never going to
cure cancer."*

Christopher Smiley,
clinical trial participant



18



ACT AGAINST CANCER | FALL 2018

.....
Message from the Director **1**
.....

*On Trial: From the Laboratory Bench to the
Pharmacy Shelves* **5**
.....

PATIENT PROFILE

Kristie Kilkelly **10**
.....

DONOR-SCIENTIST PARTNERSHIPS

Ginny L. Clements and Joyce Schroeder **13**
.....

PATIENT PROFILE

Christopher Smiley **18**

.....
*As Dry as the Desert in July: Fighting Dry Mouth
in Head-and-Neck Cancer Survivors* **20**
.....

Prevention in a Pill: The Selenium Story **24**
.....

*Building Bridges and Building Trust: Improving
Diversity in Clinical Trials* **28**
.....

*Acting Locally: Expanding Clinical Trials Across
Arizona* **30**



Melissa Lim (left) and Ruth Cañamar help keep the wheels turning at the UA Cancer Center's Clinical Trials Office.



Kris Hanning, UAHHS BioCommunications

ON TRIAL

Clinical trials
are the gateway
between the
laboratory bench
and the pharmacy
shelves

by Anna C. Christensen

The next time you pick up a prescription at a pharmacy, take a moment to appreciate the contents of that translucent orange bottle. Feel the weight of it in your palm. Tap a pill into your hand, roll it between your fingertips. Behind that little pill is a history of big ideas, one in which countless students, postdocs and research scientists designed painstaking experiments and were likely frustrated by failures.

But they persevered until they accumulated enough evidence to turn their molecules into medications.

Before being mass produced by pharmaceutical companies and distributed to your local corner drugstore, however, that

drug had to prove itself in a series of clinical trials, an essential component of medical research involving the careful testing of experimental therapies, devices, screening methods, prevention methods and other types of care. Although they mostly assess the safety and effectiveness of new drugs, trials can also be used to evaluate other strategies for improving health, such as new technologies for imaging tumors or diets specially designed to reduce cancer risk.

At the University of Arizona Cancer Center, the Clinical Trials Office oversees the trials that give participants access to care they might be unable to find elsewhere in the community. A team of compassionate clinicians manages the “front of the house,” caring for patients, while the “back of the house” hosts a flurry of administrative activity as a squad of specialists makes sure bills are paid, contracts are negotiated, and trials

are run in accordance with legal and ethical requirements.

Finding funding

“Drug discovery is not easy,” says Daruka Mahadevan, MD, PhD, co-leader of the UA Cancer Center Therapeutic Development Program. “If it were easy, everybody would be doing it.”

Fortunately, the University of Arizona is teeming with scientists following numerous leads on drug candidates — compounds that show potential to treat cancer. After rigorous testing, an elite few make their way to the clinical trial stage, at which point they might become the subject of an investigator-initiated trial, a clinical trial spearheaded by UA Cancer Center members.

“Investigator-initiated trials are the most important to us,” says



Hani Babiker, MD, cares for patients who receive cutting-edge treatments through clinical trials.

Daniel Persky, MD, director of the Clinical Trials Office. “We take an idea, which often comes from one of our collaborators in the lab, and put it in the clinic to test if it works and is safe in the patient.”

These trials are shining examples of the University of Arizona’s team-oriented atmosphere.

“Collaboration is the driving force in developing drugs, through scientists at the bench working closely with investigators in the clinic,” says Hani Babiker, MD, associate director of the UA Cancer Center Early Phase Clinical Trials Program.

Funding for these trials comes from diverse sources. Individual philanthropists’ gifts can accelerate a scientist’s research, helping propel it into the human-treatment stage.

Additional money might come from grants awarded by nonprofit organizations or federal sources.

Sometimes, pharmaceutical companies step up to help foot the bill.

“The biggest challenge is to get the funding to take a drug from preclinical studies to the clinic, which costs several million dollars,” says Dr. Mahadevan. “An investor and a passionate investigator have to be willing to take it on.”

To convince companies that investment in our investigator-initiated trials is worth their money, UA Cancer Center physician-scientists might have to go back to the lab. Compiling more enticing preclinical data could make the difference in attracting pharma funding.

“If the drug hits the target really well and there is an unmet need, chances are very high that you can take it all the way to the clinic,” reports Dr. Mahadevan.

In addition to investigator-initiated trials, the Clinical Trials Office helps run trials for pharmaceutical companies or the National Institutes of Health.

Pharmaceutical companies design their own trials, often

enlisting UA Cancer Center investigators to take part in a larger effort in which investigators from across the country — or even around the world — follow the same protocol. Results from patients far and wide are combined into a single robust data set that can clarify the safety and efficacy of a drug.

“When you put a lot of minds together, things move better,” says Dr. Babiker of these types of multi-institutional studies.

Although pharmaceutical companies benefit from the minds at the UA Cancer Center, it’s vital that patients benefit as well.

“The trials ideally need to serve both a need of our patients and a scientific need,” Dr. Persky says.

***“Drug discovery is not easy.
If it were, everybody would
be doing it.”***

Daruka Mahadevan, MD, PhD

Finally, other clinical trials are federally funded to ensure the public gets its money’s worth from their tax dollars.

“The National Institutes of Health support the trials that pharmaceutical companies would not be conducting, and that serve the needs of the

population,” says Dr. Persky. “Our institution has always participated very heavily in these trials. They are important to serve the mission of treating cancer.”

It’s just a phase

Clinical trials are typically conducted in three phases. After a molecule shows promise in the lab, phase I studies are the first to be performed in humans, giving participants access to new treatments that might later be hailed as medical breakthroughs.

According to Dr. Babiker, “One of our missions is to move the science toward developing new drugs, specifically for cancers for which we don’t have a lot available.”

These trials usually only enroll 10 to 30 volunteers, and might last only a few months.

“Phase I trials use very careful dosing and very close monitoring of patients for side effects,” Dr. Persky says. “The goal is to establish safe doses of the drug.”



As both a physician and an expert in drug discovery, Daruka Mahadevan, MD, PhD, moves fluidly between the clinic and the laboratory.

“We’re mainly looking at the best dose,” adds Ruth Cañamar, who manages the Early Phase Clinical Trials Program. “Our center has been very successful in opening trials quickly, as well as enrolling the subjects needed to complete a trial. This ability has created a great working relationship with pharmaceutical companies and continues to bring more novel drugs to our cancer center and the region, accelerating the pace of novel drug development.”

Assuming that a drug seems safe in phase I, researchers can advance to phase II, during which anywhere from 30 to more than 100 volunteers receive a dosage established in the first round of trials.

“The goals of phase II trials are to see how effective the drug is, as well as to get more information about the safety,” Dr. Persky says.

Investigators hope to predict a drug’s safety and effectiveness based on a patient’s biomarkers — chemicals in the body that could help us predict who is most likely to respond to a drug and who might be at risk for serious side effects.

“The U.S. Food and Drug Administration is now approving biomarker-driven trials in early-phase trials prior to randomized trials, a major achievement for trial designs,” Dr. Mahadevan says. “This offers benefits to a lot more patients.”

Researchers will celebrate a successful phase II trial by advancing to phase III, which can enroll hundreds or even thousands of participants. Patients are “randomized” — randomly chosen, like flipping a coin or rolling dice — into experimental groups and control groups to see how the innovation compares to standard treatment. The results illuminate which approaches work best, incrementally pushing

medical science forward, one trial at a time.

“Phase III trials are done to get a drug approved by the FDA,” Dr. Persky says. “The goal of the trial is to evaluate outcome — ideally overall survival, but sometimes survival without disease.”

After phase III, the FDA may bestow its final approval on a drug — but the investigation doesn’t stop there. Phase IV studies follow thousands of patients to obtain real-world effectiveness and safety data for the approved drug. Researchers can learn long-term survival rates and detect rare side effects.

Rising up to challenges

Clinical trials are becoming more complex as our understanding of cancer grows.

“The cancer field is changing,” Dr. Persky says. “We now understand that any one cancer is actually a collection of several different cancers. Instead of one trial, now we have five trials with smaller groups of patients.”

To recruit enough volunteers, investigators need to form good relationships with community physicians, who can refer potential participants. These physicians, however, can sometimes be reluctant to let their patients go. Some clinical trial investigators tackle this problem with proactive community outreach.

Says Ms. Cañamar, “Dr. Mahadevan goes out in the community and says, ‘When you first diagnose a patient, think outside the box. See what is available here at an academic medical center.’”

“We hope that our oncologist colleagues in the community would recognize our trials earlier on, to afford patients the opportunity to be enrolled,” Dr. Babiker adds.

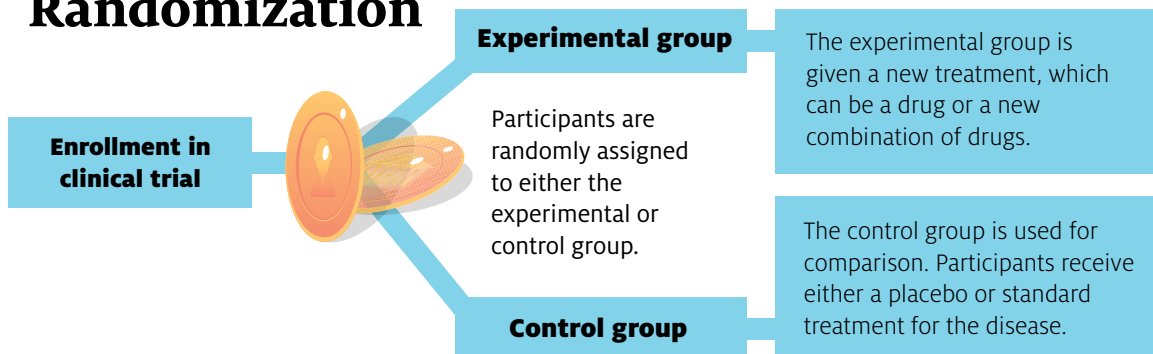
And, as clinical trials proliferate, the Clinical Trials Office is steadily expanding its staff to accommodate demand.

“Clinical trials require more and more work every year,” Dr. Persky explains. “There are a lot of requirements to collect data, a lot of checks and balances to keep patients safe, and to provide all the information necessary to evaluate if the drugs are effective. It is very much a team enterprise.”

Ms. Cañamar credits the Clinical Trials Office’s success to “the passion that everyone on our team brings to the table” — health-care providers who ensure that clinical trial participants receive the best of care, and behind-the-scenes specialists who fire on all cylinders to tame mountains of paperwork.

Despite myriad challenges, the Clinical Trials Office is staffed with people ready to face them. By successfully shepherding a new drug onto pharmacy shelves, this team represents just a few of the folks who helped turn an idea into a tangible item rolling around in an orange bottle. ▲

Randomization



PATIENT PROFILE

Kristie Kilkelly

by Anna C. Christensen

For Kristie Kilkelly, knowledge is power. She provides her high school history students with the tools needed to gather knowledge for themselves. She places a high premium on scientific knowledge. And she understands from firsthand experience that self-knowledge can be lifesaving.

"Know your body," Kristie says. "I found my breast cancer because I knew my body."

It was just before Christmas 2009, and Kristie was only 29 years old. After her biopsy, she flew from her home in Yuma to spend the holidays with her family in Ohio. But she didn't want to wait for her biopsy results. She told her doctor, "When you have the results, call me — I don't care what day it is."

That day turned out to be Christmas Eve, and the call came when she was surrounded by family.

"I will never forget that phone call," Kristie says about the day she learned she had an aggressive type of cancer called triple-

negative breast cancer. "On Christmas Day we did our thing, and the following day I jumped on the computer."

Kristie's Internet search introduced her to Robert Livingston, MD, a University of Arizona Cancer Center oncologist specializing in breast cancer.

"Dr. Livingston literally wrote the book on breast cancer research," she says. "He was the pioneer in the field. What better place for me to be?"

She had a double mastectomy, radiation and reconstructive surgery. Not only did she make it through her treatments like a champ, she also found the time for romance.

"James met me at my worst," Kristie says with a laugh. They were married in 2012 and had two sons, now 4 and 6. Then, in September 2016, she had a grand mal seizure. That's when she learned the cancer had come back — even after the double mastectomy.

"Let's face it, unless you take a microscope to every little cell, you're not going to know if you got all of it," she says. "Apparently we forgot one cell somewhere!"

'The more we know, the more we can offer'

That little cell had metastasized, spreading into her brain and her lungs.

"I had a total of seven tumors," Kristie says. "The largest one was the size of my hand."

The re-emergence of her cancer coincided with the passing of Dr. Livingston, whose death came as a shock to the UA Cancer Center community. Many of his patients, including Kristie, started seeing Pavani Chalasani, MD, MPH, leader of the UA Cancer Center's breast cancer clinical research team.

Dr. Chalasani recommended a clinical trial with a drug similar to another chemotherapy that treats colorectal cancer. Participants needed to fit a very specific profile, and Kristie's case was a perfect match.

"I felt it was almost a duty that God had put at my feet," she recalls. "They're getting valuable information from me that could change how we treat triple-negative breast cancer forever."

Every three weeks since February 2017, Kristie has made the trek from Yuma to Tucson to receive infusions of the study treatment.

"We started out with seven tumors. We're down to one tumor, in my lung, that is active but shrinking," she says.

Although Kristie encourages all patients to weigh risks and benefits for themselves, her experience as a clinical trial participant has been a positive one.

"Know what you're getting into, but also know that it will lead to so much good on the other side," she says. "We can only offer what we know about, and the more we know, the more we can offer."

'A happy place'

At work, Kristie wrangles high school sophomores and advises a political debate club. On the first day of every school year, she

tells her students about her diagnosis and throughout the year is available to talk with any student whose family is impacted by cancer.

Her refusal to give power to the stigma surrounding the disease has touched many of her students' lives.

"Quite a few of them have gone into oncology care," Kristie reports. "Until they had me as a teacher, they didn't even think it could be a happy place."

Outside the classroom, she wears her educator hat everywhere she goes. She enjoys talking to medical students and interns, and educates lab techs, guiding them to find her port, an artificial vein used to deliver cancer drugs to the bloodstream. "I could access it myself if they would let me," she says, laughing.

Through the Yuma Silver Spur Rodeo, Kristie has chaired the Tough Enough to Wear Pink campaign every February for six years, spreading awareness and honoring those who have battled the disease.

"It's a sea of pink all over the rodeo grounds. Even the cowboys wear pink," she says. "It's amazing to see a community come together."

Kristie takes great pride in her role as an ambassador for breast cancer awareness and an example of survivorship. She dislikes pity, and bristles when well-meaning acquaintances overload her with sympathy.

"I don't want that reaction," she says. "They were already giving me condolences. I'm not dead! I'm alive and I've been kicking cancer's butt!"

Along with treatments, she credits her remarkable progress to her fighting spirit, and hopes to inspire others with her story.

"This is happening to me, but it doesn't define me," Kristie says. "I am not the cancer. I am *living* with cancer. I am living proof that it's not a death sentence." ▲

"I've been kicking cancer's butt!"



Ginny L. Clements (left) and Joyce Schroeder, PhD

Ginny L. Clements & Joyce Schroeder

by Anna C. Christensen and Gaius J. Augustus

In 1956, Ginny L. Clements was a 15-year-old pom-pom girl, and the word “cancer” wasn’t on her radar screen. So when she found a lump in her breast, she initially let it go.

“Who knows anything about cancer at 15? At 15, all you think about is your studies and boys,” she says with a laugh.

Nevertheless, she finally became concerned enough to approach her mother, who was a registered nurse.

“She went into action,” Ms. Clements recalls. “I visited a couple of doctors, who told my mother that I had breast cancer and needed immediate surgery. At

that time, they not only took my breast but my breast muscle too. It was quite a shock, at 15, to wake up and have no breast and be so scared.”

“I wanted to honor and fight for those who weren’t as lucky as I have been.”

Ginny L. Clements

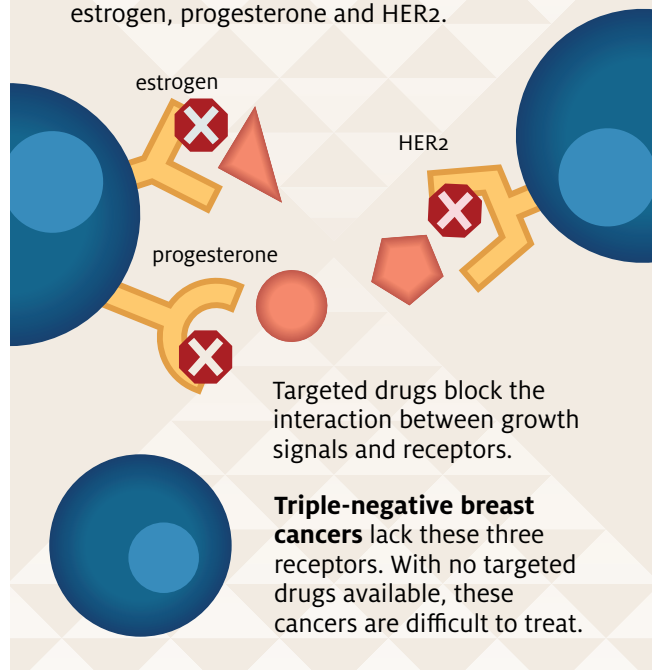
The surgery turned her world upside down.

“As a young teenager, it was very traumatic to me, to say the least, because everyone knew my family and me,” Ms. Clements says. “We lived in the small farming community of Fowler, population 1,869, which is 10 miles south of Fresno in the San Joaquin Valley of California.”

She spent her junior year recovering, worrying about

What Is Triple-Negative Breast Cancer?

Three main receptors drive the progression of most breast cancers by overloading breast cells with growth signals such as estrogen, progesterone and HER2.



what the future might hold. By senior year, she was back on the field as a cheerleader. Soon after graduation and college, she launched her adulthood in San Francisco to discover what the future had in store for her.

A promising candidate

When Ms. Clements was diagnosed, breast cancers were treated surgically with radical mastectomy. Fortunately, medical science has made enormous progress in the ensuing decades, producing chemotherapies, targeted drugs and less invasive surgical procedures.

This progress is the result of work being done in laboratories across the world, where researchers churn out drug candidates for further investigation. Most of them never make it to clinical trials. A battery of testing is required to make sure an experimental drug will not be toxic to patients and can be mass produced, but equally important is understanding how the drug might work.

The job of basic scientists such as Joyce Schroeder, PhD,

director of the UA Cancer Center Metastatic Breast Cancer Initiative and head of the Department of Molecular and Cellular Biology, is to dig into biological processes and figure out what makes cancer cells different from normal cells. Dr. Schroeder is leveraging that knowledge to develop a targeted drug that someday may help patients in the clinic.

“We need to understand what is driving cancer and what processes are specific to cancer,” Dr. Schroeder says. “If we don’t understand that, there is no way we can develop a useful therapy.”

Her hard work has paid off in the discovery of a compound that she hopes will make it through clinical trials, called SAH-EJ1, or EJ1 for short, which is being developed to treat triple-negative breast cancer. There are therapies that target the three known receptors present in most breast cancers. However, triple-negative breast cancer is notoriously difficult to treat because it lacks these three receptors. Finding a way to target it would be a huge boon for breast cancer patients.

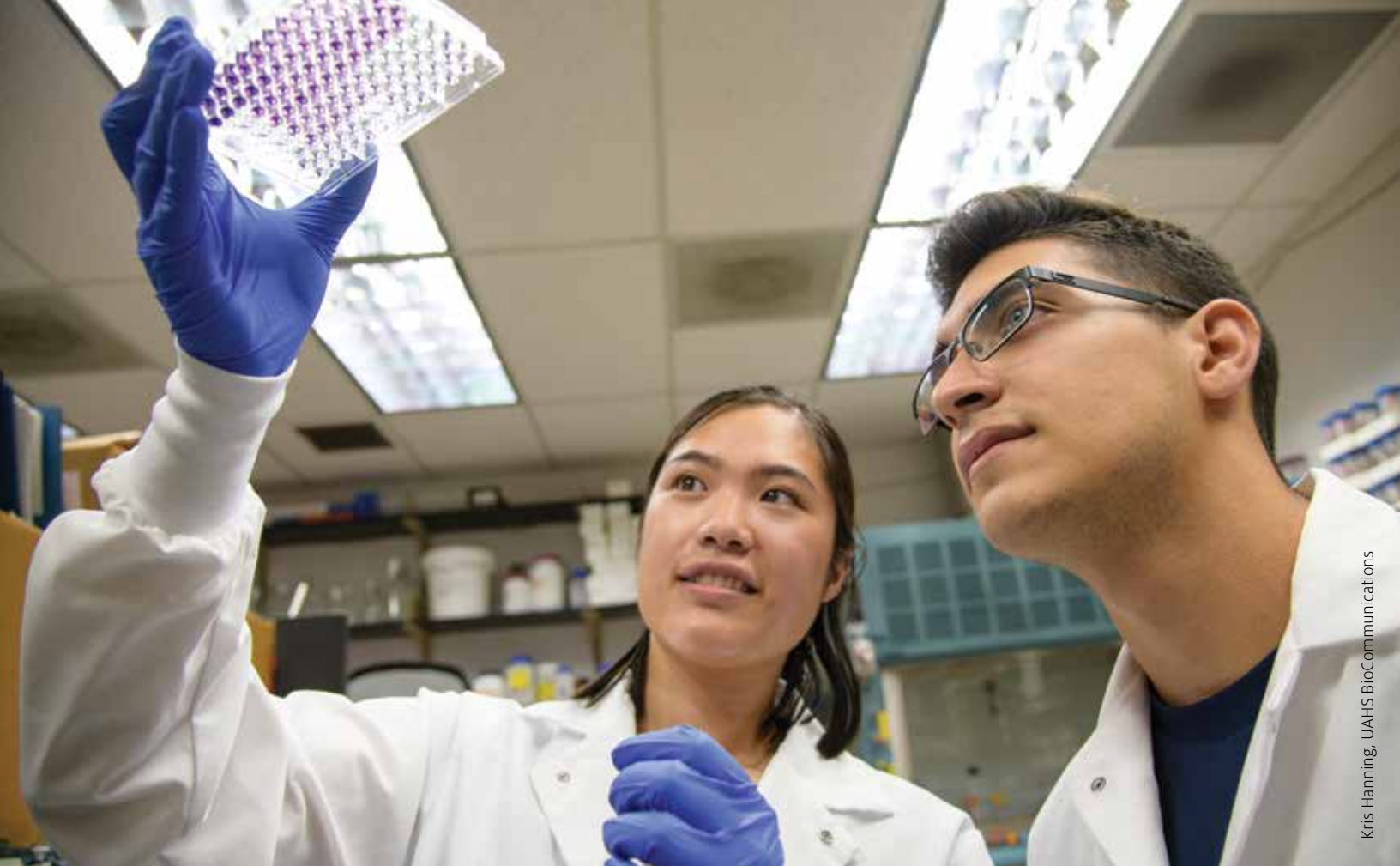
An effective treatment needs to be specific to cancer cells so that normal cells will mostly be left alone. EJ1 targets a receptor called epidermal growth factor, which is highly expressed in triple-negative breast cancer — driving the growth of these breast cancers and making it an intriguing target for a drug. Not all cancer “drivers” can be targeted by a drug, but so far, blocking the function of epidermal growth factor receptor using EJ1 has shown promise.

Dr. Schroeder’s experiments have shown that EJ1 holds strong potential for treating triple-negative breast cancer, but is especially promising in treating inflammatory breast cancer, a rare form of the disease that can progress over the course of weeks or months.

“There’s no targeted treatment for inflammatory breast cancer,” Dr. Schroeder explains. “It’s a particularly aggressive subset of the disease.”

Experiments pitting EJ1 against inflammatory breast cancer provide early evidence that the drug could be effective in clearing both the cancer and the associated inflammation.

“It effectively treats inflammatory breast cancer in animal



Kris Hanning, UAHS BioCommunications

The Schroeder Lab is powered in part by students, including undergrads Alexa Nguyen (left) and Vito Marino.

models,” says Dr. Schroeder. “Now, we’re trying to take it to human clinical trials.”

EJ1’s potential to treat some of the most challenging types of breast cancer is exciting, but moving it from the laboratory to the clinic is a long and expensive process. Before EJ1 can move into clinical trials, funding agencies must be convinced it is ready. Further tests include learning more about the drug’s toxicity profile as well as making sure it can be mass produced to meet market demand.

“Every single one of these steps requires a lot of money — and a lot of people willing to back you,” says Dr. Schroeder.

An invested philanthropist

Ms. Clements’ life in San Francisco unfolded in ways she never could have imagined back when she was 15 years old and recovering from a shocking surgery. It was there that she met a neighbor, Bill Clements, whom she married three months later. They soon moved to Phoenix, where their children were born, and in 1974 they moved to Tucson, where they grew

their family business, Golden Eagle Distributors.

In 1972, she lost her best friend, Claudia, to breast cancer. She still gets tears in her eyes when she remembers her. Years later, in 1995, lung cancer claimed her husband’s life. She took over the family business, which prospered under her leadership, seeing record sales and expansion. When she retired in 2003 from the day-to-day business operations, she wondered how she could stay active and give back to her community. Memories of her experience as a teenager came back to her.

“I decided, on my 50th anniversary of being a breast cancer survivor, to establish a legacy to fund breast cancer research,” she recalls. “I wanted to honor and fight for those who weren’t as lucky as I have been, and for those who are survivors of this horrible cancer.”

Meanwhile, Dr. Schroeder was busy at work in her lab, hoping that one of her drug candidates would someday make it into the clinic. The studies necessary to get FDA approval for an early clinical trial can take a long time if funding is unavailable

or limited. Private donors can expedite this research, making the road to clinical trials shorter.

“We were having difficulty getting government grants for drug development,” Dr. Schroeder recalls. “This is when people like Ginny L. Clements stepped in and made a huge impact — the science didn’t have to stop.”

Dr. Schroeder remembers receiving a call one day, more than a decade ago, notifying her that a prospective donor was in the building. “Ginny wants to talk to anybody who’s doing breast cancer research,” Dr. Schroeder was told. “She’s coming down to talk to you in 20 minutes.” The meeting changed the course of Dr. Schroeder’s work.

“Unlike most donors, she interviews her scientists,” says Dr. Schroeder. “She showed up in the lab, walked through, and

we talked about what we’re doing and where we wanted to take our research. She started putting her money into our lab. She’s been absolutely phenomenal.”

“I don’t want to give money and not know where it’s going. That’s not my style,” says Ms. Clements of her collaborative approach. “I’m so happy that I have the means to do this. I’m very blessed.”

Dr. Schroeder was immediately impressed by Ms. Clements, whose dedication to finding a cure has never wavered.

“She is 100 percent laser-focused on curing breast cancer,” Dr. Schroeder says.

That focus took decades to develop. Between the time of her diagnosis in 1956 and the formation of the Ginny L.

Eli Soyfer helps the Schroeder Lab push science forward while working toward a master’s degree in molecular and cellular biology.



Kris Hanning, UAHHS BioCommunications

Clements Breast Cancer Research Fund at the University of Arizona Cancer Center in 2006, Ms. Clements never discussed her early battle with breast cancer publicly. She credits the burgeoning awareness movement surrounding breast cancer with shifting her outlook.

"I made a decision to openly change how I felt about my experience with breast cancer," she recalls. "Before it was a pretty hush-hush subject. I felt that I needed to speak out and be more transparent."

Ms. Clements also makes it clear why breast cancer research is a priority for her.

"I'm doing this for those who have lost their lives — especially for Claudia," Ms. Clements says of her philanthropy. "When people die who are close to you, you really want to fight."

Though she put her pom-poms down decades ago, Ms. Clements still knows how to energize a crowd, and along with other donors is a source of inspiration for Dr. Schroeder.

"They're like a cheerleading section," Dr. Schroeder says of the philanthropists who make her research possible. "A lot of times you're working hard and having a variety of roadblocks. Staying optimistic can be difficult during those times, but my donors always email me, call me, send a letter saying, 'We were thinking about you. Thank you for all that you're doing to cure this disease.'"

Ms. Clements is hopeful that Dr. Schroeder's research will be successful.

"I think Joyce has been on the right road," says Ms. Clements. "But at times, we have been struck with disappointing reports, which has brought tears to my eyes, wondering if we are ever going to make it happen. Research is fickle. Sometimes you hit it out of the ballpark, and sometimes you don't. I sincerely think EJ1 is so promising, and I feel I will see the fruits of my labor and Joyce's labor down the way."

An exciting journey

After years of success as a laboratory scientist, Dr. Schroeder now looks forward to moving her targeted therapy from the lab to the clinic, but first she needs to complete FDA applications and more rigorous testing.

"There was a lot about the clinical trials process that I didn't know about," says Dr. Schroeder. "The largest difference between a clinical trial and basic research is that it's going to happen in a human being."

Taking her research from the laboratory into a human body is an undertaking that Dr. Schroeder regards with great respect.

"Moving from the lab to patients raises a lot of concerns, because you would never want to harm a patient," says Dr. Schroeder. "You're already going through your data to make sure it's as accurate as possible, but when you have

that additional emotional concern, it really makes you sit back and re-evaluate everything."

All the effort is well worth it, as EJ1 is inspiring optimism and progress is being made to advance to a phase I clinical trial.

"I have the utmost faith that I am making a difference, and with Joyce's continued research, together, we will eradicate breast cancer in women and men in our lifetime," Ms. Clements says.

It has already been a long journey, but a potential treatment for triple-negative breast cancer is working its way toward clinical trials much faster thanks to donors such as Ms. Clements, Dr. Schroeder's laser-focused cheerleader. ▲

Your gift funds groundbreaking discoveries that make a difference in the lives of our patients. To learn more, please visit uacc.arizona.edu.

"When people like Ginny stepped in, the science didn't have to stop."

Joyce Schroeder, PhD



Photo courtesy of Christopher Smiley

PATIENT PROFILE

Christopher Smiley

by Anna C. Christensen

Christopher Smiley was caught in the vortex of a cross-country move from Mississippi to Arizona when he found a patchy white sore on the bottom of his tongue. It was unusual, but he'd had sores in his mouth before, so he placed his worries on the mental backburner. Instead, he and his wife, both active-duty military for nearly two decades, concentrated on relocating their household and three children from the Deep South to the Southwest.

"Fast forward about six months," Christopher recalls. "The lesion started growing. It was starting to cause some pain. I finally slowed down and realized it was time for me to get this thing looked at."

A dentist was sufficiently alarmed to order a same-day biopsy — a move that shook Christopher out of his six-month state

of denial. When the results came back, he had a diagnosis: squamous cell carcinoma.

The news was a shock. Before he knew it, he had seen a cadre of medical professionals, and his surgeon, Audrey Baker, MD, removed part of his tongue and 84 lymph nodes from his neck. Three of them came back positive for cancer, showing it had spread to his neck.

'Someone has got to be the guinea pig'

Christopher's new life in Tucson included regular visits to the University of Arizona Cancer Center. In addition to receiving chemotherapy and radiation, he enrolled in a clinical trial for an experimental immunotherapy treatment called IRX-2. Although many people would balk at taking an unapproved drug, its experimental nature didn't faze him one bit.

"If we're ever going to stumble upon a cure for cancer, someone has got to be the guinea pig," he says. "Besides, I was

already dealing with cancer. How much worse could it be?”

If IRX-2 worked as hoped, it would make his cancer less likely to return. The idea was immensely appealing to Christopher — even when he was told there was a 1-in-3 possibility of being placed in the control group, meaning he wouldn’t receive IRX-2.

“If there was a chance of it helping me, I wanted to be a part of that,” he recalls.

But Christopher soon discovered he had been assigned to the control group.

“I was slightly disappointed,” he admits. “But if I didn’t participate, that just prolongs finding out whether that drug is actually helpful.”

At the end of the day, Christopher knew his involvement helped push science forward, making a better world for tomorrow’s patients — and for his children.

“If I have to deal with cancer, that’s one thing, but the thought of my children having to deal with it really bothers me,” he says. “Medicine doesn’t just fall out of the sky. Without drug trials, we’re never going to cure cancer.”

‘Life is very precious’

Christopher’s diagnosis led to a shift in perspective.

“When you’re faced with this deadly disease, you quickly realize that life is very precious,” Christopher reflects. “I decided it was time to move forward with my goals.”

After years of toying with the idea of going back to school, he made the decision to enroll in the UA Eller College of Management.

“I started my MBA program a month and a half after treatment,” he says. “I still didn’t have hair growing on the back of my head.”

Christopher also started a blog, an outlet for his complex emotions that soon connected him to an eager support network.

“It started off with just friends and family,” he recalls. “After treatment was over, I had upward of 400 people who read every day.”

He also drew strength from his military training, especially

his work as a resiliency instructor for the U.S. Air Force Noncommissioned Officer Academy. He taught his fellow airmen to cope with curveballs and chronic stress in a constructive way, helping them withstand hardships and recover from their aftershocks.

“Little did I know that those skills were going to become a huge factor in my own life,” he says. “Cancer can poison your mind if you allow it to. Resiliency plays a major role in someone’s treatment and ability to get through it.”

“I find beauty everywhere I go.”

Now that Christopher is on the other side of his treatment, he is back to enjoying activities that have brought him joy throughout his life, such as basking in the magnificence of nature.

“I find beauty everywhere I go,” he says. “One of my goals in life is to hike the entire Pacific Crest Trail, from the border of Mexico to the border of Canada. I have that on my agenda for as soon as I retire from the military.”

For Christopher, the future is as wide open as a vista over a Western landscape. ▲

Radiation destroys every cell in its path. These X-rays are a lot like the sun’s rays, only much stronger. Patients essentially receive internal and external sunburns everywhere those X-rays penetrate: gums, mouth, tongue, throat, lips. Imagine trying to eat or drink while having the world’s worst sunburn inside your esophagus.

My saliva production has taken a huge hit. I wake up in the morning with no moisture in my mouth and throat. I find myself struggling to get water down without choking. A single swig of water usually takes me three to four swallows. If I don’t swallow fast enough, water gets into my windpipe. The decreased level of saliva production hurts my ability to taste some things, and kills my ability to eat dry foods: chips, popcorn, breads.

Adapted from Christopher Smiley’s blog, smileysemojicancer.blogspot.com



From left to right: Kirsten Limesand, PhD, Rachel Meyer, Michael Rice, MS, and Wen Yu “Amy” Wong

AS DRY AS *the* DESERT IN JULY

A fleeting nuisance for most,
dry mouth can wreak havoc
on a head-and-neck cancer
survivor’s quality of life

by Anna C. Christensen

Kirsten Limesand, PhD, professor of nutritional sciences in the University of Arizona College of Agriculture and Life Sciences, never expected to study dry mouth for a living, but she’s happy with where her career path has taken her.

As a graduate student, Dr. Limesand explored how insects transmit viruses from one host to another — work that involved dissecting mosquitoes’ salivary glands. She cites that skill as one of the biggest reasons she landed a job investigating saliva production. If their new hire could dissect a mosquito salivary gland, the reasoning went, she would have no trouble dissecting a mouse salivary gland. It turned out to be a permanent gig.

“The more time I spent with the project, the more it was clear to me that this was a great research niche,” Dr. Limesand recalls.



Photos: Kris Hanning, UAHS BioCommunications

Most of us have experienced temporary symptoms of dry mouth, but for head-and-neck cancer survivors who have completed chemoradiation, it could be a permanent part of life, bringing a collection of unpleasant symptoms along for the ride.

"Most people don't think about saliva being important — until you don't have it," says Dr. Limesand. "It's like living in the desert in July all the time."

Saliva contains proteins that kick-start the digestion process and protect our teeth and gums. It moistens our mouth and makes food easier to swallow. Without it, meals may lose their luster and oral health can take a nosedive.

"Foods, especially those that are dry — bread, meat — become difficult to eat," says Panayiotis Savvides, MD, PhD, MPH, section leader for the UA Cancer Center Head and Neck Program and medical director of the Clinical Trials Office at the UA Cancer Center in Phoenix. "They have to modify their diet to be able to swallow."

"Eating is no longer pleasurable," adds Dr. Limesand. "If I have a mouth full of canker sores and have to go to the dentist all the time so I don't lose my teeth, life is pretty miserable."

Although no cure exists for post-chemoradiation dry mouth, treatments are available, including oral lubricants, saliva substitutes and saliva stimulants, but they cannot fix the root cause: a damaged salivary gland.

"Many patients are being cured — but they always have a water bottle with them," says Dr. Savvides. "If we cannot solve their problem, we feel powerless."

Cleaning up the mess

The United States is in the midst of a head-and-neck cancer epidemic, and the patient profile has shifted from heavy drinkers and smokers to younger people whose cancers were caused by human papillomavirus (HPV). While an epidemic is bad news, the good news is that these patients have a better prognosis.

"On average, they are younger, healthier — because they're not smokers — and they respond better to treatment," says Dr. Savvides. "They are expected to live 30 or 40 more years, so the long-term side effects are important. It's a bigger issue than if you're treating an 80-year-old whose life expectancy is five years or so."

Patients usually are treated with a combination of chemotherapy and radiation — chemoradiation.

“The typical treatment with radiation is done daily, Monday through Friday, for almost six-and-a-half weeks,” Dr. Savvides says. “As they accumulate more radiation, one of the long-term side effects is a reduction in saliva production. For some patients, it lasts the remainder of their life.”

Although radiation is crucial for destroying tumors in the head and neck, the salivary gland may be an innocent bystander. Over the course of treatment, it absorbs more and more radiation, and the closer it is to the tumor site, the more damage it sustains. After treatment, a salivary gland might lose its ability to produce saliva or manufacture its protective proteins.

Fortunately, UA Cancer Center researchers are devoted to finding a cure for post-chemoradiation dry mouth — and hope they have struck gold in the form of a drug called everolimus, which already is used to treat other types of cancer.

Although previously approved by the FDA for its tumor-suppressing properties, everolimus could have another function that would help head-and-neck cancer survivors. It might activate autophagy, which Dr. Limesand describes as “a cellular recycling process.”

Autophagy breaks down damaged components of cells and misfolded proteins, clearing the way for the body to rebuild itself in the wake of injury. Radiation, however, is thought to obstruct autophagy, leaving a damaged salivary gland unable to clean up the mess and “reopen for business.” Dr. Limesand found that a drug called temsirolimus, a “sister compound” of everolimus, activates autophagy in mice, leading to restored salivary function. She hopes clinical trials in humans will show that everolimus can “send the damaged tissue down the road to heal itself.”

Testing the hypothesis

Clinical trial participants receive excellent care from their physicians, who know they have to be extra vigilant in monitoring their patients’ treatment.

“When we use standard of care, we have a lot of experience using the drug,” says Dr. Savvides. “In clinical trials, that experience can be very limited. We have to be a lot more thoughtful and be prepared for surprises.”

Many investigator-initiated trials at the UA Cancer Center are funded by the Clinical Research Oversight Council (CROC). Helmed by a team of experienced UA Cancer Center scientists, CROC is responsible for evaluating the merit of research proposals and divvying up resources to support them, and is funded in part by donors.

“It’s difficult to secure funding,” says Dr. Savvides. “We received the drug free of charge from the company, but having seed money from donors allows these concepts to move forward.”

Thanks to CROC support and gifts from donors, Dr. Limesand’s laboratory-driven hypothesis will be tested in the clinic. Dr. Savvides designed and recently opened the trial at the UA Cancer Center in Phoenix. It is a pilot study, formally known as a “phase zero” clinical trial, and will enroll only 10 to 16 patients.

“It’s a proof of principle,” Dr. Savvides explains. “We want to show that everolimus does what we think it’s going to do.”

One of the advantages of investigating alternative uses for an FDA-approved drug is that there are already piles of toxicity data, allowing the team to skip phase I testing. After the pilot study, if they receive positive results, researchers will advance to phase II trials.

“If everolimus had not already been approved for humans, it would have had to go through extensive regulatory

and experimental processes before we could start testing it to see if it could restore salivary function,” Dr. Savvides says. “That process could take five years or more.”

The team will measure both volume and composition of participants’ saliva, using a suction tube inserted into the mouth — “very similar to when you go to the dentist,” Dr. Limesand says. The first measurements will be taken before patients start chemoradiation and will be tracked throughout treatment. Afterward, participants will take everolimus for five days, and investigators will see if saliva production bounces back.

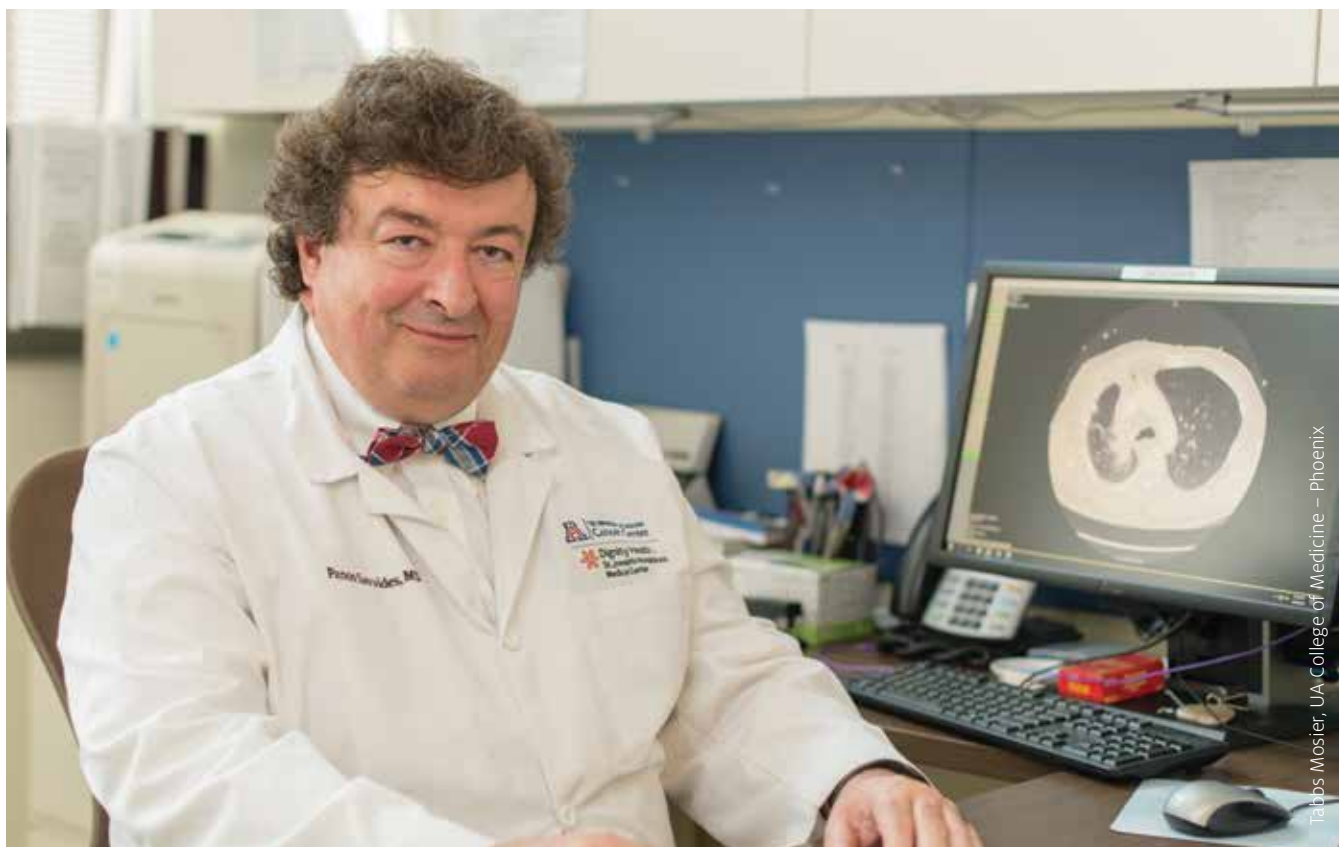
In addition to stimulating the production of more saliva, the researchers hope it will improve the composition of saliva.

“Composition plays a major role in how dry these patients feel,” says Dr. Limesand. “If you have proteins to protect from cavities, but not the proteins that moisten the oral cavity, you are going to feel dry even though you have sufficient production.”

The UA Cancer Center is uniquely poised to bring cutting-edge science to patients.

“One of the most exciting aspects of oncology are the major

“Most people don’t think about saliva being important — until you don’t have it.”
Kirsten Limesand, PhD



Tatiana Mosier, UA College of Medicine — Phoenix

In Phoenix, Panayiotis Savvides, MD, PhD, MPH, investigates a drug he hopes will restore cancer survivors' salivary function.

improvements we have seen in our everyday practice,” Dr. Savvides says. “There is constant improvement, and sometimes it’s dramatic. For those of us who have seen the struggles of cured patients, being able to decrease the magnitude of the problem, or completely eliminate it, is inspiring.”

Forging more partnerships

Today, head-and-neck cancer survivors with post-chemoradiation dry mouth have no good options to restore salivary function. Unlike loss of appetite and hair loss, dry mouth might not be a well-known side effect of cancer treatment, but to these patients, the condition is life altering.

“I periodically receive emails from patients,” Dr. Limesand says. “If I weren’t already fully vested before, feeling their angst coming through the text is a good reminder every single day of the need to do something about this problem, because very few options are available.”

Research that addresses unmet patient needs is made possible by UA Cancer Center teamwork. The Clinical Trials Office in Phoenix was launched in 2016, opening a door for collaboration between Tucson and Phoenix. The everolimus trial illustrates how this alliance can make the science stronger and the research faster.

“Some fantastic individuals in Phoenix want to work with us,” Dr. Limesand says. “As the relationship between the two campuses grows, we hope to go to Phoenix more often, even if it’s just going to lunch and talking science. Great ideas sometimes happen on napkins.”

“That interaction is one of the main aspects of a comprehensive cancer center,” Dr. Savvides adds.

By expanding researchers’ pool of potential collaborators, the Tucson-Phoenix partnership builds more links between scientists and clinicians with compatible interests. Dr. Limesand especially values the input she receives from physicians, whose everyday contact with patients helps her “laser in” on research priorities. As a basic scientist, she does not see patients, but she knows improving their lives is the ultimate goal — and a high point of her career is knowing that her laboratory work is being put to the test in the clinic.

“I feel incredibly privileged to witness something that has come from the bench to the clinic,” Dr. Limesand says. “It’s mind-blowing. You almost have to pinch yourself and say it’s real!” ▲



From left to right: Sherry Chow, PhD, Peter Lance, MD, and Elizabeth Jacobs, PhD, are behind milestone clinical trials evaluating whether selenium supplements can reduce cancer risk.

PREVENTION IN A PILL

The selenium story has been a rollercoaster ride punctuated by high hopes and deep disappointments



by Anna C. Christensen

Vitamins and minerals are celebrated for their ability to promote health. Iron staves off anemia, and a collection of B vitamins averts maladies ranging from beriberi to birth defects. In the 1970s, vitamin C supplements enjoyed widespread popularity for their purported power to fight the common cold and even certain types of cancers — although these claims were handily debunked by clinical trials.

The idea that cancer prevention might be found in a pill, easily plucked from the shelves of any grocery store, continues to hold appeal. Additionally, with approximately half of all U.S. adults taking some kind of vitamin or mineral supplement, it is important that scientists conduct the tests necessary to untangle fact from fiction — so

that consumers can make the best decisions for their own health.

Clumps, bumps and lumps

Colorectal cancer is foreshadowed by polyps, also known as colorectal adenomas, clumps of cells that form in the colon and sometimes can turn into cancer, but can be detected and removed during a colonoscopy.

***“When we do research,
there are always more
questions raised when
it’s done.”***

Elizabeth Jacobs, PhD

“If you take the adenoma out and put it in the bucket, that adenoma can’t go on to become cancer,” says Peter Lance, MD, professor of medicine and former University of Arizona Cancer Center deputy director – Phoenix and director of the Cancer Prevention and Control Program.

“But people who have grown one or more adenoma are at

greater risk to develop new adenomas.”

Furthermore, says Sherry Chow, PhD, co-leader of the Cancer Prevention and Control Program, “Reducing the recurrence of colorectal adenomas can reduce one’s risk of developing colorectal cancer.”

The idea that colorectal cancer can be prevented by a proper diet makes intuitive sense. After all, our foods pass through our colons, so it seems plausible that the chemicals in our diets could have positive or negative interactions with the cells they encounter on their journey through the digestive tract. Identifying important dietary compounds has been a source of intense scientific interest.

Early hints

Selenium, a mineral found in water and some foods, lacks the name recognition many other vitamins and minerals have. Most people associate vitamin C with oranges, calcium with dairy and iron with red meat — but they draw a blank when it comes to selenium, although selenium supplements are available in grocery stores and pharmacies. Since the 1990s, researchers at the UA Cancer Center have been at the forefront of investigations into this mineral’s potential for cancer prevention.

Early evidence hinting that selenium supplements could protect against certain cancers led to a burst of studies testing that claim. One such study was the Nutritional Prevention of Cancer Trial, helmed by the UA Cancer Center’s Larry C. Clark, PhD, MPH, which primarily examined the effect of selenium supplementation on non-melanoma skin cancer. Although investigators failed to find a link, they detected something else: a reduced risk of colorectal cancer.

UA Cancer Center nutritional epidemiologist Elizabeth Jacobs, PhD, who worked on the study as a first-year graduate student, remembers the flood of media attention the results received. Suddenly, selenium for cancer prevention was the talk of the town.

“After Larry Clark’s study came out, he told this story that he went into Costco and all the selenium was off the shelves,” Dr. Jacobs recalls. “People had bought it up.” (Dr. Clark passed away in March 2000.)

But the public was reacting to a single study. Was the rush on selenium premature? The question needed more scrutiny.

Digging deeper

To learn more about selenium’s possible role in preventing cancer, Dr. Lance opened the Selenium and Celecoxib Trial. His team recruited participants with precancerous polyps, but with no history of colorectal cancer.

After their polyps were removed, says Dr. Chow, “We followed them to see whether those precancerous growths came back.”

The researchers accumulated data over a period of 12 years, but at the end of the trial, selenium supplementation was not associated with an overall reduction in polyps, suggesting it would not be effective for preventing colorectal cancer. The result was a major disappointment for “Team Selenium.”

A closer look at the data, however, revealed the “heterogeneity of treatment effect,” in which different types of people responded differently to selenium depending on factors such as age and medical history. Participants who had advanced colorectal polyps at the beginning of the study were 18 percent less likely to see a recurrence if they took selenium, raising the possibility that selenium could provide a modest benefit compared to people who started out with smaller, less advanced polyps.

On the other hand, the team found that participants who were 63 or older saw a slight increase in Type 2 diabetes. Therefore, while selenium might benefit some people, its effect may be neutral in other people and could be harmful in an older population.

“When we do research, there are always more questions raised when it’s done,” Dr. Jacobs says.

To unravel these mixed results, Dr. Jacobs received a \$2 million grant from the National Cancer Institute to delve deeper into the data.

“What I’m looking at now is whether subgroups of people actually did have a favorable response to selenium supplementation,” says Dr. Jacobs. “We’re really drilling down into the factors that might predict your response to selenium.”

Mulling over null results

When studies find connections between an easily accessible dietary supplement and reduction in cancer risk, those results can grab headlines and clear store shelves.

"After selenium had been shown to potentially be effective in preventing cancer, some people just started taking supplements," Dr. Chow says with a laugh.

However, follow-up studies that fail to confirm these links — those that report "null results" — don't typically attract the same level of attention. Just as it is essential for us to be aware of different ways to reduce our cancer risk, so too is it crucial to know what strategies are not backed by science.

"So many people are taking selenium," Dr. Jacobs says. "It is really important to find out whether taking these supplements is a good idea."

The best way to find out is through a randomized clinical trial, in which some people receive the supplement and others receive a placebo. Participants are followed over time, and the overall health of the supplement group is compared to the overall health of the placebo group to evaluate effectiveness.

"Once you get suggestive evidence, it's critically important that you do a really rigorous study," Dr. Lance says. "Before we introduce agents into clinical practice, we need to know they are effective."

Rather than being healthful or even benign, supplements could cause harm. UA Cancer Center researchers uncovered one such example when they noted the possible link between selenium supplementation and Type 2 diabetes. Other examples abound, including findings that high doses of beta-carotene are associated with increased risk of lung cancer in male smokers.

"There are other stories like that in early chemoprevention trials, where we thought a compound could prevent cancer, but we actually found they increase cancer risk," says Dr. Chow. "Null results are important for us to understand the risks and benefits of dietary supplementation."

To supplement or not to supplement

Although some special populations might benefit from supplements — pregnant people, the elderly — Dr. Jacobs believes, for the most part, they're superfluous.

"People who take supplements are generally the people who need them least," she says. "These individuals are already eating a diet high in fruits and vegetables, and are throwing more nutrition on top of that."

Even in the face of negative evidence, many people will continue to take supplements, feeling they are hedging their bets. After all, vitamins and minerals are a natural part of our diets, so supplements are widely assumed to be free of major risks.

"Many people have a definite belief that dietary supplements are safe no matter how many they take," Dr. Jacobs says. "But we've shown repeatedly that that's not the case. In food, it is generally safe. When we take stuff out of food and put it into supplements, we take it out of its natural habitat."

Until more studies are completed, Dr. Jacobs advises consumers to be cautious.

"With regard to the overall effectiveness of dietary supplements, there is really no evidence that they will prevent cancer — and we need more investigation whether they can actually promote cancer growth," Dr. Jacobs says. "We need to know as much as possible to help people make decisions that are optimal for their health."

Since her work with the UA Cancer Center's first selenium trial in the 1990s, Dr. Jacobs has moved onto other research projects, such as investigations into cancer risk in firefighters and the association between vitamin D and breast cancer. With her current work on selenium and colorectal cancer, Dr. Jacobs has come full circle.

"It's now 20 years later, and we still have these questions," Dr. Jacobs says. "That's science — we're still trying to dig through this." ▲

"People who take supplements are generally the people who need them least."

Elizabeth Jacobs, PhD

BUILDING Bridges *and* **BUILDING** Trust Improving Diversity in Clinical Trials

by Gaius J. Augustus

Not long ago, most clinical trials enrolled only men. Women were excluded for a variety of reasons, some of them contradictory. Sometimes fluctuating hormone levels were the reason. Other times it was the assumption that patients have the same response to drugs, regardless of sex.

“For so long, it was assumed we were all the same, and that largely meant white males,” says Peter Lance, MD, professor of medicine and former University of Arizona Cancer Center

deputy director – Phoenix and director of the Cancer Prevention and Control Program.

Once researchers started separating data by sex, however, they discovered the blind spots that had plagued past research. Studies found that women are more likely to develop gallbladder, anal and thyroid cancers, while men are more likely to develop colorectal and lung cancers. Additional studies have found that some drugs, such as checkpoint inhibitors in advanced cancers, can vary in efficacy according to the patient’s sex.

Enrollment of women in clinical trials has increased over the last two decades, though there is room for improvement. Unfortunately, clinical trials still fall short of giving us a representative picture of our population.

“The United States is a melting pot, but people with the most need are often not involved in clinical trials,” explains Jennifer Hatcher, PhD, MPH, MSN, associate director for community outreach and engagement at the UA Cancer Center. “We can’t say that we understand a problem if the people experiencing the problem aren’t included in research studies. We must include the entire population, or our clinical trials just aren’t valid.”

Nature and nurture

Humans share more than 99 percent of their genes, and this communal gene pool has some amazing benefits, giving researchers the ability to test drugs in small groups of people to predict how well they will work in everyone. Our genetic similarities make clinical trials optimal for sorting through the many therapeutic options to find the best treatments for cancer and other diseases.

“Based on who you are, what you look like or where you live, you are going to have differences in your health.”

Jennifer Hatcher, PhD, MPH, MSN

However, just as male-only studies ignored the biological differences of women, clinical trials that don’t include people of color ignore biological differences based on heritage. That 1 percent difference in our DNA can make some people more vulnerable to cancer or less responsive to cancer therapies. It can even change where and how fast a cancer grows.

“For some diseases, there are differences on the basis of ethnicity,” Dr. Lance explains. “To make sure we’re not missing differences between one subpopulation and another, it’s important that we include a broad swath of our population in our clinical trials.”

Despite making up almost 40 percent of the U.S. population, racial and ethnic minorities are less likely to participate in clinical trials. For example, only 5 percent of participants are Hispanic, our largest ethnic minority, representing 18 percent of the population.

Genes are not everything. Our environment also shapes our susceptibility to cancer, and is more than just the quality of the air we breathe or the water we drink. It also includes lifestyle factors such as diet and exercise,





Jennifer Hatcher, PhD, MPH, MSN

or a long list of other bad guys, from ultraviolet rays to stress. Each of these variables can affect the risk of disease.

“Based on who you are, what you look like or where you live, you are going to have differences in your health,” says Dr. Hatcher.

Breaking down barriers

Underrepresented minorities can include people based on many factors: race, ethnicity, gender, gender identity, sexual orientation, geography and even income. It may seem simple to enroll more patients from diverse backgrounds into clinical trials, but many face barriers to participating. One by one, we can confront those barriers.

Improving diversity in clinical trials starts with communication. Explaining the benefits in language that patients can understand is essential to attracting participants.

“Study recruitment materials may not have been translated to a minority’s native language, and may have used insensitive language,” says Sherry Chow, PhD, co-leader of the Cancer

ACTING LOCALLY EXPANDING Clinical Trials Across Arizona



Pavani Chalasani, MD, MPH, leader of the University of Arizona Cancer Center’s breast cancer clinical research team, is working to improve awareness of clinical trials for breast cancer patients.

She recently was awarded a grant through the V Foundation, a privately funded charitable organization that champions “Victory Over Cancer.” Dr. Chalasani will spearhead this grant at the UA Cancer Center to improve outreach to potential clinical trial patients.

Prevention and Control Program. “That has hindered the recruitment of minority populations.”

Dr. Chow recently completed enrolling participants in a clinical trial to study the role of metformin in breast cancer prevention. Her team placed a high priority on recruiting a representative sample of Hispanic women.

“Thirty-six percent of our participants identify as Hispanic,” Dr. Chow says. “We’ve been successful because we have native Spanish speakers reviewing study-related documents to make sure they are culturally sensitive, and going to a clinic that provides care to minority patients to recruit participants.”

Language barriers are not isolated to Spanish-speaking patients. Native communities also benefit from staff who speak their language.

“Many of our elders who don’t speak English or who have limited English proficiency can’t fully comprehend the value of clinical trials,” explains Karen Francis-Begay, MA, UA assistant vice president of tribal relations. “We need to be culturally



Karen Francis-Begay, MA

“I’m hoping to help break down some of the barriers that keep people from reaping the benefits of clinical trials,” Dr. Chalasani says. “We’d like to expand community awareness, streamline the process and bust some of the myths about clinical trials.”

Through social media, radio ads and participation in community events, she hopes to find effective strategies to engage a broader and more diverse portion of the population. This outreach starts with raising awareness about clinical trials.

“Right now, a lot of stigma and fear surround clinical trials,” says Dr. Chalasani. “People are suspicious of experimental drugs. As clinicians, we need to do a better job of explaining the process to patients.”

Dr. Chalasani also aims to involve nurse navigators and financial advisers in educating patients and to provide them with a comprehensive overview of the clinical trial process.

She would also like to expand outreach and education to Native-American and Hispanic communities — two groups that are underrepresented in clinical trials. Her team will welcome Spanish-speaking nurse navigators and hopes to talk to tribal leaders to understand the cultural barriers faced by Native Americans.

“To be inclusive of more people, we need to learn more about the cultures in Southern Arizona,” she says. “That will help us understand the barriers that underserved populations are facing and how we can reach them in culturally specific, sensitive ways.”

Dr. Chalasani hopes that these combined efforts will improve enrollment in breast cancer clinical trials that truly reflect the community. If her efforts are successful, her winning strategies likely will be adopted by other disease teams. ▲

respectful in our approach of creating an awareness that clinical trials can be beneficial and can contribute to their wellbeing.”

Participation in clinical trials might also come with a financial burden. Many families rely on public transportation or share a car, and clinical trials sometimes require extra visits to the clinic or are far away from rural patients.

“Clinical trial sites are in the cities, yet the populations you’re trying to reach are often in remote areas,” says Ms. Francis-Begay.

Even taking time off of work can give a patient pause when considering whether to enroll in a clinical trial.

“Many worry that they are going to lose their jobs if they come into the clinic for long hours,” explains Jorge Gomez, MD, PhD, associate director of the Center for Border Health Disparities at the UA Health Sciences. “This is very difficult when the whole family depends on a single income.”

Dr. Gomez believes that community outreach is an important part of clinical trials.

“We expect patients to come to us,” says Dr. Gomez. “It’s important that we, as an institution, go out to people in the community. We can build trust, teaching them how to improve their lives, prevent diseases and increase awareness of screening.”

Healing from the past

Before a patient takes a pill, agrees to be in a clinical trial or even is diagnosed with cancer, researchers can take steps to improve relationships with underrepresented communities. The history of medical research in these populations is fraught with lingering distrust of the scientific community.

“Sometimes people think an experimental drug is going to give them a lot of problems. They don’t know whether they are experimenting with them as guinea pigs,” says Dr. Gomez. “Underrepresented populations have suffered from abuses in the past, so they are suspicious about our intentions.”

“Historically, it has been difficult to include diverse populations in clinical trials, mostly because of this issue related to trust,”

Dr. Chow adds. “The minority population is worried about sharing intimate health information in the clinical trial setting.”

Dr. Hatcher says it is up to researchers to rebuild burned bridges.

“We need people standing in that gap between the research and the community,” she says. “Then we can understand what the community needs from us, and the community understands what we are asking for and why.”

Cultivating trust also can come organically by training future researchers from diverse populations. Bringing together bright minds from all walks of life

enriches the scientific process.

“Diversity helps us understand what our research questions should be,” Dr. Hatcher explains. “When we put more people at the table, the questions become more relevant to the communities we are serving.”

Learning from past mistakes and improving the inclusion of underrepresented populations is also an opportunity to give back to these communities. Dr. Hatcher is hopeful for a future in which clinical trials include people from across the population.

“We’re all working for everyone to have the best health possible,” Dr. Hatcher says. “I see the future of clinical trials bringing everyone to the table, studying things that are relevant to everyone, not just to the majority.” ▲



Jorge Gomez, MD, PhD

Donations Fuel Cancer Research

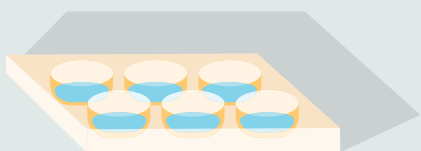
Your gift supports research that will uncover new, lifesaving cancer treatments.

\$50



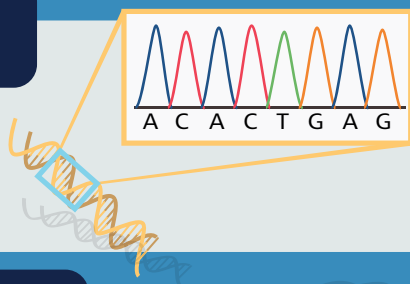
5 hours on a confocal microscope, enabling researchers to study molecules in cells

\$100



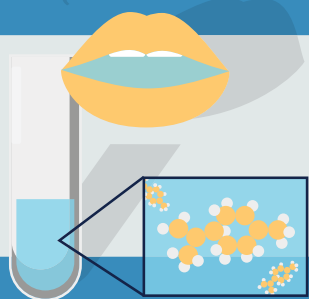
10 tissue culture plates, allowing researchers to test new drug therapies in cancer cells

\$1,000



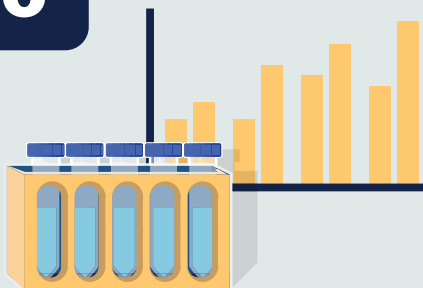
Analyze a tumor sample for highly expressed genes, which helps researchers find new drug targets

\$10,000



Determine if salivary glands are functioning in 20 cancer patients

\$50,000



Advance a candidate drug to the next testing stage



THE UNIVERSITY OF ARIZONA
Cancer Center

1515 N CAMPBELL AVE
PO BOX 245018
TUCSON AZ 85724-5018



NONPROFIT ORG
US POSTAGE PAID
TUCSON ARIZONA
PERMIT NO. 190

BEAR DOWN **BEAT** **CANCER**

