Broccoli’s Hidden Potential

Protect your skin • Raising the bar • Wear your veggies
Digging deeper • Highlights in giving
In my 45 years as an oncologist and physician-scientist, I have gotten great satisfaction from each and every patient I have had the great privilege to treat. I have witnessed great outcomes and seen some wonderful people succumb to the disease we call cancer.

I have also been personally gratified with the hours, days, weeks, months and years that I have spent in our research laboratories here at the University of Arizona Cancer Center, for what comes from those laboratory benches directly impacts our amazing patients and our people.

There are hypotheses and questions that lead to experiments, failures, advancements, more tests, and successes that translate into new drug therapies or technologies that can further us on our journey to prevent and cure cancer.

In fact, since I became an oncologist in 1968, the five-year survival rate for all cancers was less than 50 percent. Now, 45 years later, it has risen to 67 percent, but we must do dramatically better. We owe it to our patients who are “dying for a cure.”

I am looking forward with great excitement to returning to the research laboratory, where I know we can continue to make great strides toward treating and curing patients, as well as finding exciting, innovative ways to prevent cancer and other chronic diseases.

Sincerely,

David S. Alberts, MD
The University of Arizona Cancer Center Director

Join the Protect Your Skin Program

The University of Arizona Cancer Center’s Skin Cancer Institute has established the Protect Your Skin Program to help communities become sun safe. This program offers sunscreen stations and sun safety awareness signs to interested organizations. These stations can be placed in areas where workers and visitors will have access to the sunscreen.

In 2008, a partnership began between the Skin Cancer Institute (SCI) and the Arizona Cancer Desert Museum to offer free sun protection to the museum’s visitors. Permanent signage and sunscreen dispensers were placed in the museum bathrooms for visitors to use. The response was overwhelmingly positive.

In 2011, the SCI was awarded a $2 million Community Connections Grant to fund permanent educational signage and install sunscreen dispensers in the bathrooms of many major outdoor attractions in Tucson, including Reid Park Zoo, the Pima Air and Space Museum, the Tohono Chul Park, Tucson Botanical Gardens and Biosphere 2.

The total attendance for these major outdoor attractions in Tucson is close to 1.5 million visitors each year. Many of these visitors are from other states or countries and are not prepared for the severe desert climate.

The Protect Your Skin starter kit costs $50, which includes two sunscreen dispensers, two sun safety signs to post next to sunscreen dispensers and one gallon of SPF 30, zinc-oxide based sunscreen. In addition to these materials, program participants will have access to reduced prices on dispensers and sunscreen for future orders. Those who order through R&M Lotion will see 15 percent of future orders donated to the UACC Skin Cancer Institute’s continuing efforts to make Arizona a sun-safe community.

For more information, please call 1-888-724-2749 or visit protectyourskinaz.org.

WHAT YOU GET

2 SUNSCREEN DISPENSERS
2 SUN SAFETY SIGNS
1 GALLON OF SPF 30, ZINC OXIDE-BASED SUNSCREEN

Make your business or organization sun safe by purchasing a Protect Your Skin kit for only $50. Program participants will also have access to reduced prices on future orders.

RAISING THE BAR

The field of cancer biology has taken incredible leaps forward in recent years, but these advances are just the first steps toward the ultimate goal of preventing and curing cancer. It will fall to the next generation of research scientists to turn that goal into reality.

The University of Arizona Cancer Center not only prides itself as a top-notch clinical care facility and research institute, but also as a leading education and training resource. The Cancer Biology Training Grant was federally funded in 1978 with Eugene Gerner, PhD, as principal investigator. From this grant, the Cancer Biology Graduate Interdisciplinary Program was established in 1988.

The goal of this program is to harness the collective passion and experience of the researchers already making major breakthroughs at the UACC so it can be imparted on bright, idealistic students looking to make breakthroughs of their own.

“The idea behind this program was to create this pipeline of researchers that will look to find the next great therapies for treating cancer, as well as understand the mechanisms of how cancer develops so we can learn to prevent it before it starts,” said Cancer Biology Graduate Program Chair and UACC Chief Scientific Officer Jesse Martinez, PhD.

Twenty-five years later, the Cancer Biology Program has established itself among the nation’s most well-respected training programs, graduating 74 doctoral students with the exemplary research skills necessary to join the fight against cancer.

“What I loved most about this program is that the mentors set a high standard for their students, and they expect them to achieve it,” ShannonFortin Ensign, PhD said. “It really pushed me to be the best scientist I could be.”

Dr. Fortin Ensign graduated from the CBO Program this spring and will return to the UA College of Medicine – Phoenix to complete her medical degree. She, like her fellow CBO graduates, is among the most sought after young biomedical researchers in the United States.

“There is a lot of respect nationwide for the UA Cancer Biology program,” said Nhan Tran, PhD. “CBO students looking for positions in academia or in the biomedical industry have a big advantage, because people know they will be very well trained, and they already have a built in networking system.”

Dr. Tran speaks from experience. He is a product of the UA’s Cancer Biology Graduate Program (class of 2002), where he studied the mechanisms of prostate cancer. He served as one of Dr. Fortin Ensign’s primary mentors. Dr. Tran, now the head of the CNS Tumor Research Lab at the Translational Genomics Research Institute (TGen) in Phoenix and research assistant professor at the UA, pushed Dr. Fortin Ensign to publish as much original research as possible.

“My motto is publish or perish,” Dr. Tran said.

Dr. Fortin Ensign used that rigorous writing schedule to her advantage, approaching the challenge as an opportunity to expand not only her knowledge base, but also to take calculated risks, knowing she had a strong support system behind her.

Mentorship is a two way street, as well. Dr. Tran explained that the students are often responsible for some of the most insightful, creative thinking, in large part because students often approach an issue with a new set of eyes and a new angle.

“Students are a truly vital part of the research process, as they often challenge the research their mentors put forth,” Dr. Tran said. “We learn as much from them as they learn from us.”

Programs such as these are facing tough economic times, however.

“One of the truly wonderful aspects of the UA Cancer Center is that there are more than 100 pre- and post-doc students in our research facility on a daily basis, thanks to our major training efforts,” said UACC Director David Alberts, MD. “One of the things I’m most worried about, with the trends we’re currently seeing in the federal budget, is a reduction of funding for training, which would mean we lose our next generation of scientists.”

The goal of a cancer-free future is within reach, but it will up to the next generation of biomedical scientists to achieve it.
A diet heavy in cruciferous vegetables, such as broccoli sprouts, has shown potential risk-reduction properties for colorectal, prostate and various other forms of cancer. Dr. Dickinson’s research currently focuses on how sulforaphane – a naturally occurring compound in broccoli with established chemopreventive properties – could potentially be used to help patients reduce their risk for skin cancer.

What sets Dr. Dickinson’s research apart? Instead of eating broccoli to unlock the risk-reduction nutrients, she’s asking patients to apply small doses of sulforaphane to their skin. Think of it as a broccoli-based sunscreen additive.

“Even though there is heightened awareness about the need for limited sun exposure and use of sunscreens, we’re still seeing far too many cases of skin cancer each year,” Dr. Dickinson said. “We’re searching for better methods to prevent skin cancer in formats that are affordable and manageable for public use. Sulforaphane may be an excellent candidate for use in the prevention of skin cancer caused by exposure to ultraviolet rays.”

Dr. Dickinson, a research assistant professor in the Pharmacology Department at the University of Arizona and a UA Cancer Center member, began investigating broccoli’s chemopreventive properties when she started her postdoctoral studies in 2005 in the laboratory of Tim Bowden, PhD – one of the UACC’s most influential research scientists. Prior to joining Dr. Bowden’s laboratory, Dr. Dickinson earned her PhD through the Genetics Graduate Interdisciplinary Program at the UA, studying oxidative stress and heart disease.

Under Dr. Bowden’s guidance, Dr. Dickinson pursued her postdoctoral training and built up an impressive list of credentials in her own right. As Dr. Bowden transitions into retirement, Dr. Dickinson will take over the majority of his lab’s ongoing projects, including this in-depth look into sulforaphane.

“I learned so much from working with Dr. Bowden,” Dr. Dickinson said. “He is a hypothesis-driven, old-school scientist who quietly extracts the best out of everyone around him. I’m truly honored that he’s handing his lab’s reins over to me.”

So, how would topical broccoli-based ointments differ from the products currently available in stores? Dr. Dickinson’s research shows that sulforaphane is a highly adaptable, highly effective agent when it comes to inhibiting cancer-causing pathways (such as the AP-1 protein), while activating chemoprotective genes (such as the Nrf2 gene).

Her pilot study in collaboration with Johns Hopkins University will test a topical broccoli sprout solution on the skin of a group of patients to see if the compound is effective in the context of solar simulated light. Previous studies have shown that the extract is quite safe for both topical and oral administration.

If the research proves to be successful, Dr. Dickinson believes this could lead to even more applications for sulforaphane.

“Sulforaphane is the kind of compound that has so many incredible theoretical applications if the dosage is measured properly,” Dr. Dickinson said. “We already know that it is very effective in blocking sunburns, and we have seen cases where it can induce protective enzymes in the skin.”

Someday, patients with compromised immune systems may be able to apply sulforaphane to their skin in order to reduce their risk of skin cancer. Sulforaphane is one of the many natural products and pharmaceutical agents being explored for use in topical prevention of UV-induced skin cancers through the Chemoprevention of Skin Cancer Program Project Grant, headed by Dr. Bowden and UACC Director David Alberts, MD.

Dr. Dickinson’s research could potentially lead to a day when parents are instructing their children to not only eat their vegetables, but to wear them, as well.

-The Majority of Dr. Dickinson’s research is funded through K07 Career Development Awards (CA132959, CA132956) via the National Cancer Institute. Dr. Dickinson was also awarded a generous $25,000 gift from the Phoenix Friends of the University of Arizona Cancer Center, as well as an $8,000 seed grant from the UACC Skin Cancer Institute.

With skin cancer emerging as one of the world’s most prevalent forms of cancer, researchers are using every tool at their disposal to fight this disease.

The tool of choice for Sally Dickinson, PhD?

Broccoli.

Wear Your Veggies

Act Against Cancer

After a few months of growing, some roots of a broccoli plant will reach a depth of more than five feet.

The word broccoli comes from the Italian word “brocco,” meaning arm branch.

More than 30,000 broccoli plants can grow in the space of only one acre.

It takes about 144,000 broccoli seeds to equal one pound.

Over the last 25 years, broccoli consumption has increased more than 940 percent.

Source: Kurt Nolte, area agriculture agent with the Yuma County Cooperative Extension.
Uranium exposure has led to some devastating public health consequences, including potential increased risk for certain forms of cancer. It’s an issue that truly hits home for Monica Yellowhair, PhD.

Yellowhair, a postdoctoral research associate with the University of Arizona Cancer Center, grew up in Kayenta, Ariz., on the Navajo Nation. That area near the Four Corners was home to some of the richest uranium mines in North America. According to the Environmental Protection Agency, nearly four million tons of uranium ore was extracted from this area between 1944 and 1986. This radioactive element was in high demand during the Cold War, as increased demand for atomic weapons led to unprecedented mining in the area. During this time, uranium became the driving force of the Navajo Nation’s economy, while Cold War, as increased demand for atomic weapons led to unprecedented mining in the area. During this time, uranium became the driving force of the Navajo Nation’s economy, while

Yellowhair was among the first students to get involved with the NACP in its early stages, which allowed her to develop working relationships with some of the UACC’s top faculty, including Clark Lantz, PhD; Patricia Thompson, PhD; Jesse Martinez, PhD, and UACC Director David Alberts, MD.

Dr. Yellowhair enrolled in the PhD program at the University of Arizona in 2005 and is currently in the second year of her postdoctoral research program. She’s seen her research on this topic published in more than a half-dozen publications and has established herself as an authority on the subject as the issue has gained momentum over the last decade.

“We already know that uranium exposure has serious radiological consequences and increases one’s likelihood of suffering from leukemia or lung cancer, but what I’m primarily trying to figure out is if prolonged exposure to depleted uranium has a chemical consequence, which is an area we don’t know as much about yet,” Dr. Yellowhair said. “If the impact is, in fact, chemical, uranium exposure could lead to increased risk of bone, kidney, stomach, pancreatic, colon and prostate cancers.”

In May 2013, Dr. Yellowhair explored the impact of copper and gold mining in small Mexican villages to serve as a comparative study to what she has been researching in Arizona. Her study’s hypothesis is that populations with higher uranium exposure will have an increased uranium concentration compared to the low-exposed group. As a result, populations with higher uranium exposure will have an abnormal DNA repair response when compared to a lower exposed population.

Her study’s target population is women in good health, ages 18 or over who are non-smokers and have experienced limited exposure to hazardous agents. She will be comparing the data from her study to what she has been researching in Arizona. Her study’s target population is women in good health, ages 18 or over who are non-smokers and have experienced limited exposure to hazardous agents. She will be comparing the data from her study to what she has been researching in Arizona.

“Not only that, but there is an older study that shows potential for uranium to mimic estrogen, which, if true, could open the door to all sorts of unforeseen issues.”

This isn’t just an issue that affects Navajo Nation or small Mexican mining villages, either. Uranium particles have occasionally been found in the Colorado River, and soldiers serving in Iraq and Afghanistan have encountered serious uranium exposure, as well.

When it comes to the field of depleted uranium exposure and its impact on cancer, we are just scratching the surface. Researchers such as Dr. Yellowhair will continue digging deeper.

“We’re studying women primarily because this has been an under-studied demographic on this issue,” Dr. Yellowhair said.

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By making a planned gift to The University of Arizona Cancer Center, you provide a legacy that benefits future generations. Please consider creating a legacy for you and your family.

To learn more, please visit arizonacancercenter.org or e-mail development@uacc.arizona.edu or call (800) 327-2873.
THE PHOENIX FRIENDS ARE AN ‘ESSENTIAL PIECE’

The Phoenix Friends of the University of Arizona Cancer Center have a history of caring. For 27 years, they have worked to raise more than $6 million to support cancer research. Their signature event, “An Evening with the Friends,” marks the culmination of their efforts, and it provides a way for people to come together to celebrate friendship, have a great time, and — most importantly — raise research dollars.

On March 16, this group of dedicated, energetic women did it again. The theme of the evening was “You’re an Essential Piece,” because each of the friends, and the guests at the celebration, are an essential piece of the puzzle to end suffering from cancer. Close to 500 people attended the event at the Montelucia Resort in Scottsdale to enjoy hors d’oeuvres, cocktails and a chance to bid on fantastic prizes in the silent auction. The night was complemented by a video presentation with UACC researchers Lee Cranmer, MD, PhD, and Sally Dickinson, PhD, to remind everyone about the purpose of the event.

A highlight of the evening was The Friends’ recognition of longtime “Best Friend,” UACC Director David Alberts, MD, for his dedication to the group. “Dr. Alberts has been a friend in every way,” said Colleen Ragland, Phoenix Friends president. “He kept us up-to-date on the UACC, answered personal questions about cancer, even called to comfort our friends at any time of day or night when we were dealing with this disease.”

Proceeds that night reached $250,000, and will fund research programs at the UA Cancer Center.

“The event was a huge success,” said Suzanne Hanson, Phoenix Friends event co-chair. “We thank all who worked so many long hours as well as those who attended – all ‘Essential Pieces’ in providing dollars for research at the University of Arizona Cancer Center.”

- By Marisa Allen