Finding Elegant Solutions to Cancer Care

AFTER LOSING his father to cancer, Paul Read, MD, PhD, set out to reinvent how patients with advanced cancer receive care.

The process Read and his UVA team are developing is transformative. Read’s approach for patients whose cancer has spread to the bone, for example, will reduce weeks of radiation treatments to a single, half-hour visit. It also implements a comprehensive monitoring system that will keep close tabs on patients’ physical and mental well-being. The prevailing goal is to keep patients out of the hospital and in the comfort of their own homes.

The discovery improves not just quality of care but quality of life. “My father was ill and died of cancer in the hospital and I started thinking about all the ways we could improve our care,” Read explains. “I started to think about mechanisms that might help the healthcare system be aware of the patients’ symptoms and status… and to prevent a hospitalization most patients don’t want.”

Looking for a “Master Switch” to Fight Brain Cancer

Patients with glioblastoma—the most common and aggressive form of brain tumor—face a grim prognosis, with few expected to survive beyond two years after diagnosis. There is no cure for the disease, but UVA researchers have identified a promising target that may lead to effective new treatments for brain tumors, as well as other cancers.

Diacylglycerol kinase alpha (DGKa) is an enzyme that acts as a “master switch” for tumors, explains Benjamin W. Purow, MD, a physician and researcher in UVA’s Neuro-Oncology Center. He and his colleagues believe DGKa is essential for the survival of glioblastoma cells, regulating their proliferation and the formation of tumors.

“This is an exciting new target in cancer,” says Purow, who co-authored an article about his research that was recently published online by the journal Cancer Discovery. “It seems to have potential not just for brain tumors but for other cancers as well.”

One of the reasons glioblastomas are so difficult to treat is because the tumors invade the brain with finger-like extensions that infiltrate the tissue, making them difficult to completely

CONTINUED ON BACK COVER
Decades of reproductive medicine research focused on contraception has led to a groundbreaking discovery that sparks new hope for women diagnosed with ovarian and uterine cancers.

John Herr, PhD, professor of cell biology, urology, and biomedical engineering, and his colleagues have identified a protein (sAS1B) that is present in a high percentage of ovarian and uterine tumors. The protein is located on the cell membrane, on the outward facing surface of the cell, making sAS1B a promising target for therapies that use cell surface molecules to introduce drugs that will kill cancer cells without harming healthy cells.

“The sAS1B molecule is found in the normal body only in oocytes [growing female eggs]. Its high incidence rate and normal restriction to only oocytes offers the opportunity for selectively targeting the tumor without harming other organs,” explains Herr, director of UVA’s Center for Research in Contraceptive and Reproductive Health. “The discovery of this new class of oocyte-associated cancer antigens opens up a new pathway for our team to develop drugs that solely aim for the tumor and do not affect other tissues in the body.”

And because the protein occurs naturally only in growing female eggs within the ovaries—but not within the pool of egg reserves—resulting therapies should spare fertility. Preliminary research also has found the protein in bladder, kidney, and pancreatic cancers in both women and men, offering the potential to develop new treatments for these diseases as well.

An internationally renowned expert in reproductive cell biology, Herr has discovered more than 35 previously unknown genes in the human genome that are involved in sperm and egg development. He has successfully translated technologies developed from research in reproductive biology to the field of cancer therapy.

From Contraception to Cancer Therapy

On April 5th, the John Paul Jones Arena opened its doors for the third annual Cavaliers Against Cancer Texas Hold 'Em Tournament. This year, the event—run by Shawn Brydge, Jason Chestnutt, and UVA Clubs—raised $14,000 for the Rebecca Clary Harris, MD, Memorial Fellowship. This contribution brings their three-year total to more than $30,000. The fund provides clinical and translational research fellowships to graduate students or fellows in the Human Immune Therapy Center at UVA Cancer Center.
basic research into commercially viable products, such as SpermCheck Fertility—the world’s first at-home male fertility test.

“The path-breaking finding of SAS1B, which is opening up this new avenue for cancer therapy and diagnosis, is resting on the shoulders of an enormous amount of basic science work,” says Herr. “We were asking a very fundamental question originally: What are the unique proteins found in the ovulated egg? The applied opportunity in cancers came after many years of basic research accumulating knowledge about the development of eggs.”

“The Human Genome Project, completed about a decade ago, which identified hundreds of genes about which virtually nothing was known, is just beginning to flower,” he continues. “The public has wondered how the work on the genome will result in tangible benefits. Work in biology requires a deep patience, but rest assured, the benefits are coming out as we refine the specific knowledge on the product of each gene… one novel protein at a time.”

Sandy Foglia understands first-hand the heartbreak of caring for a loved one with terminal cancer. Following the loss of her husband, Ron, last July, Foglia wanted to help other cancer patients and their families. She organized the Ron Foglia Memorial Golf Tournament to benefit the UVA HOPE Cancer Care group, where Ron was treated during his 10-month battle with mesothelioma. Attended by more than 150 friends, family members, and UVA caregivers, the tournament raised more than $27,000.

“I wanted to do something positive in Ron’s memory and in celebration of his life,” says Foglia, who was married to Ron for 42 years. “We’ve been able to do good things with these funds, and it’s certainly helped my family and me in healing. My grandsons were proud that their grandfather had so many friends.”

Mesothelioma is a rare cancer caused by asbestos exposure. Though doctors at UVA HOPE provided most of Ron’s care, he also traveled to New York to see one of the foremost experts on the disease and get specialized surgery and radiation treatments.

“It was pretty traumatic for us to have to travel for those treatments,” she says. “It’s not only expensive, but also difficult just to find some place comfortable to live for six weeks or more—often far away from your support network.” Small comforts made a big difference to the Foglias in New York and at HOPE.

The golf tournament proceeds already are making an impact, having been used to support patients, purchasing comfort items, such as blanket warmers, iPads, and massage chairs for HOPE treatment facilities.

“It’s important to make sure UVA stays strong in this community and continues to provide excellent healthcare,” Foglia says. “Ron and I went to a lot of different medical facilities during his 10-month illness, and UVA was great. They provided exceptional care. And not only did they take care of Ron, they took care of me, too.”

SHOOT OUT FOR CANCER
Sponsored by the UVA Student Athlete Mentors, this fun, carnival-style event allows children and their families to meet and play with their favorite UVA athletes, all while benefiting a great cause. This year’s event raised more than $3,200, which will support the UVA Stem Cell Transplantation Program. Thanks to everyone for making Shoot Out for Cancer a great event year after year!
Brain Cancer

continued from cover

remove with surgery. Purow and his colleagues are hopeful that targeting the DGKa enzyme will block the cancer’s pathways and inhibit its growth.

the researchers already have identified a drug that targets the enzyme, though it hasn’t yet been approved for use in humans by the Food and Drug Administration. Purow is hopeful of beginning clinical trials within two years.

Looking at cancer in a different way

As a cancer researcher, Purow has learned that there isn’t just one answer to treating brain tumors—or any other type of cancer. Finding the right treatment requires multiple approaches because the response to therapy can vary widely from patient to patient. He compares the resulting sense of frustration to playing the old arcade game of Whac-A-Mole.

“It seems that you hit that one target, and one or two other things pop up to compensate,” Purow says. “Scientists used to think there was a single mutation that drives cancer, and if we had the drug to block that mutated protein, we would shut down the cancer completely. But for the most part, that doesn’t really seem to be the case. Ultimately, we will need a combination of different things.”

“If it’s possible to personalize medicine and to find three things, for example, that drive a person’s cancer and hit them all at once, we might be able to forestall the Whac-A-Mole problem,” he explains.

Purow emphasizes that the recent discovery of the new potential drug target isn’t a cure for glioblastoma or other cancers. However, it might prove to be a powerful new “tool in the toolbox” to complement traditional therapies such as surgery, radiation, and chemotherapy. For brain cancer patients, the answers can’t come too soon.

“i see patients along with doing research, and the scientific progress just can’t come fast enough,” Purow says. “It’s terribly frustrating and heartbreaking that we can’t offer more effective treatments to all our brain cancer patients. We have to do our best research and move as fast as we can to bring new hope to these patients and their families.”