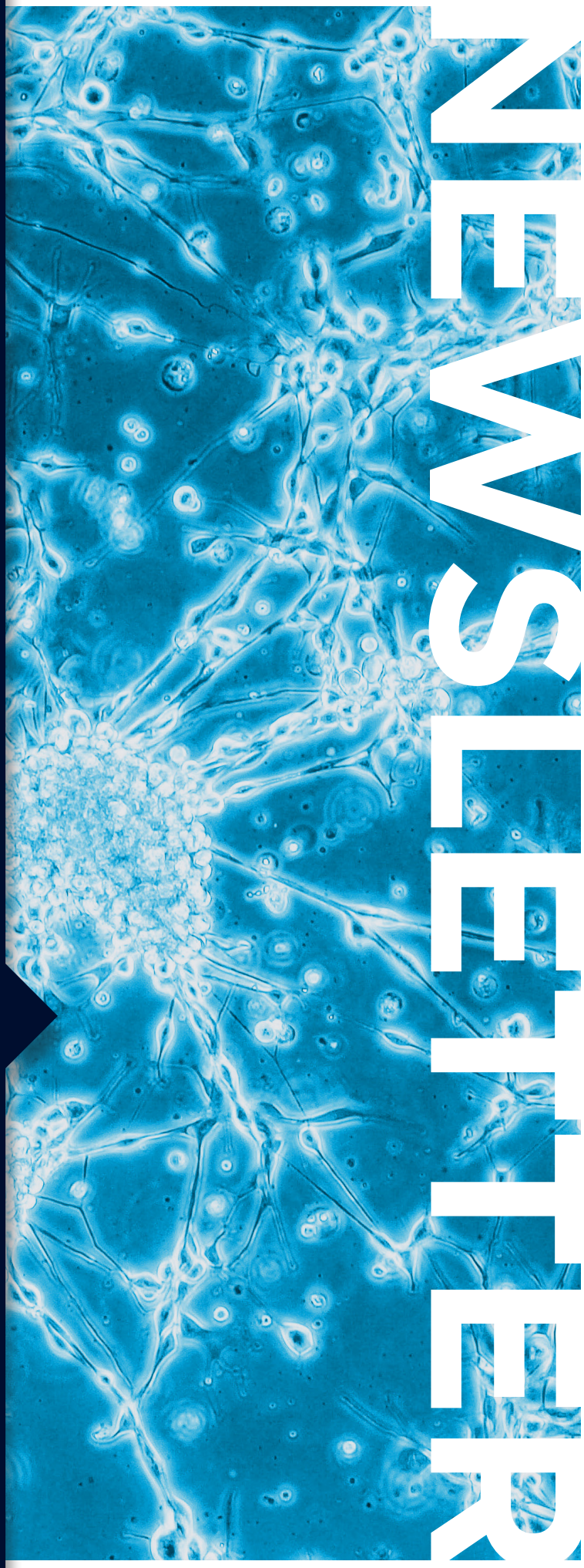
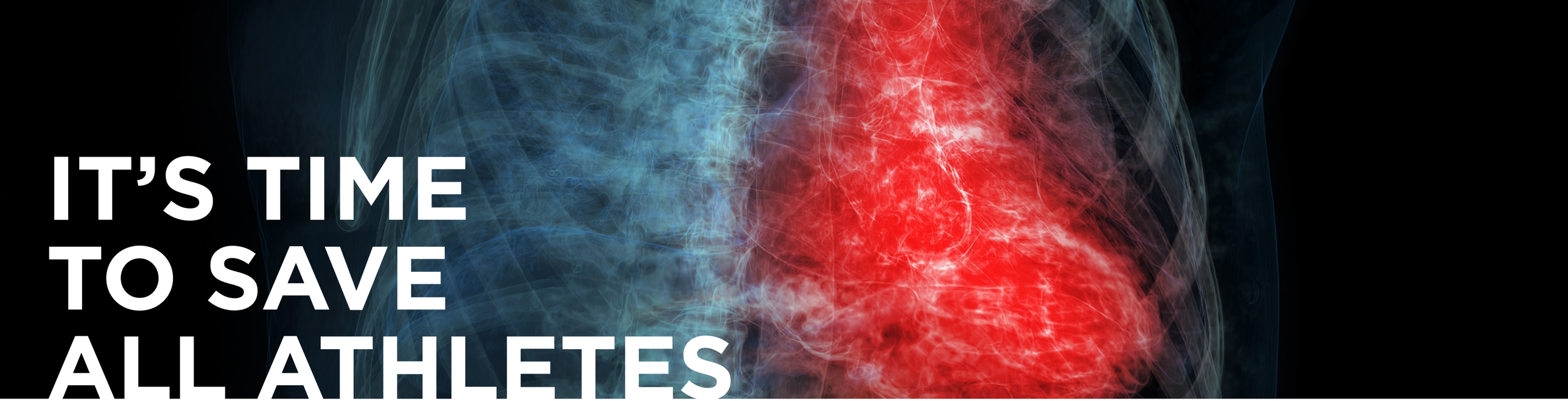
SPRING 2023 QUARTERLY NEWSLETTER | EDITION 1

UCONN RESEARCH





IT'S TIME TO SAVE ALL ATHLETES

Courtesy of the Korey Stringer Institute, College of Agriculture, Health and Natural Resources

KOREY STRINGER INSTITUTE ON PLAYER SAFETY AFTER DAMAR HAMLIN EMERGENCY

Researchers from UConn's Korey Stringer Institute discuss the recent on-field cardiac event experienced by professional football player Damar Hamlin. At a time when the world is watching, they explain the importance of life-saving resources like those Hamlin received to be available to athletes at all levels around the country.

In early January 2023, many of us watched the traumatic events of a sudden cardiac arrest unfold live during a Buffalo Bills and Cincinnati Bengals game. Thankfully, Damar Hamlin has since made a full recovery. There is little doubt that the on-site medical staff and execution of the emergency action plan saved Damar's life. But sadly, many athletes in our country who experience cardiac arrest or other medical emergencies during sport don't have access to this type of immediate care. At UConn's Korey Stringer Institute (KSI) and our partner PlaySafe, we believe that all athletes deserve access to high-quality and timely healthcare, regardless of income, geography, level of competition, or any other factor. "The mission of the Korey Stringer Institute is to provide research, education, advocacy and consultation to optimize safety, maximize performance, and prevent sudden death for the athlete, warfighter, and laborer," says Douglas Casa, CEO and professor of kinesiology in UConn's College of Agriculture, Health and Natural Resources (CAHNR). "That commitment applies to all athletes, from youth sports through professional and Olympic-caliber competitors."

Prepared for Anything

While a sudden cardiac arrest in sports is rare, it can happen at any time, in any sport, at any level of competition. Sudden cardiac arrest is the leading cause of death in sports, contributing to over 60% of all catastrophic injuries in sports. But as we saw in the case of Damar Hamlin, sudden cardiac arrest does not need to be a fatal event for athletes. A 2019 study found that 83% of athletes who sustained a sudden cardiac arrest survived if an athletic trainer was on-site and involved in the resuscitation; 89% of athletes survived if an on-site automatic external defibrillator was used in the resuscitation. Sadly, Athletic Training Locations and Services (ATLAS) data reveals that more than one-third of high schools in the United States that have athletics have no access to athletic training services. This needs to change.

With proper prevention, recognition, and treatment of sudden cardiac arrest in sport, athletes can survive. Through KSI's research, programs, and advocacy, we are working to ensure all athletes have access to on-site athletic trainers and venue-specific athletic emergency action plans. We also believe that early action when a problem occurs – from recognition of sudden cardiac arrest to activation of emergency medical services and access to an automated external defibrillator (AED) within 1-3 minutes of all athletic venues – will help save lives. "This past week, through the efforts of athletic training colleagues and other medical staff, a young man's life was saved," says Jason Powell, director of athletic training for PlaySafe. PlaySafe, a non-profit provider of athletic training services, provides access to medical services through the development of community partnerships and other sources at large.

Advocacy for Athletes

Why doesn't every team have access to these lifesaving resources? Athletic training services are often not state funded. Schools are responsible for seeking other financial support, which may be challenging. Through the innovATe project, PlaySafe and KSI have been instrumental in affording athletic training services for high schools in South Carolina. The innovATe project, funded through the NFL's Education Fund, is a $3 million dollar initiative to increase access to medical care provided by an athletic trainer for secondary school athletes in under-resourced communities around the country.

"The innovATe project helps fund the addition of athletic training services in high schools that have not previously been able to support that type of position," says Christianne Eason, president of sport safety and director of the innovATe project. "Communities like the Abbeville County School District in South Carolina clearly care about the health and well-being of their student athletes. Thanks to funds provided through the innovATe project and support from PlaySafe, this community now has access to the medical care that an athletic trainer is able to provide."

To enact widespread change, we need the understanding and support of decision-makers and representatives. Another KSI initiative is working to enhance sports safety policies for high schools across the country. The Team Up for Sports Safety (TUFSS) project, sponsored by the National Athletic Trainer's Association and the NFL Foundation, was established to drive change and adoption of policies proven to reduce catastrophic sport injury at the high school level. Working together in the context of individual states around the country, we aim to formalize actionable items for adoption or improvement of health and safety policies. "We have seen that when stakeholders for high school athlete health and safety come together for a collaborative conversation surrounding lifesaving measures for sport, these critical policies are adopted faster," says Rebecca Stearns, chief operating officer of KSI and assistant professor in residence at CAHNR.

"In TUFSS' first three years alone, 38 states adopted policies that made high school athletes safer. States where health experts collaborated through TUFSS saw an increase of about 10% in the number of policies to reduce catastrophic sport injury."

While projects enacted by KSI and partners like PlaySafe are moving the needle in player safety, more needs to be done. Every athlete deserves the expert, immediate, lifesaving care provided to Damar Hamlin. That's why we at the Korey Stringer Institute and PlaySafe will continue to advocate for athletic training services and evidence-based sports safety policies, because we know they will help keep our young athletes safe, reduce the incidence of catastrophic injuries and illnesses, and ensure appropriate care is given in the event of a catastrophic incidence.

ACADEMIC CANNABIS SYMPOSIUM EXPLORES BREADTH OF A GROWING INDUSTRY

By Matt Engelhardt

UCONN'S TWO-DAY CONFERENCE EXAMINED WIDE-RANGING CANNABIS TOPICS INCLUDING RESEARCH, HEALTH BENEFITS, ENTREPRENEURSHIP, LAW, SCIENCE, RECREATION, AND MORE

Against the backdrop of the state's expanded support for cannabis research and industry, UConn welcomed a range of experts, business leaders, and consumers for a cannabis symposium on March 16 and 17.

The symposium was convened to discuss a burning topic in Connecticut's political, economic, and moral foregrounds. In January, cannabis became legal in the state for medical and recreational purposes, creating new opportunities for revenue while advancing discussion on the safety and research potential. These topics were covered in detail at the symposium, which featured many UConn researchers as well as presenters and speakers from across the state and country. "This event emerged from the desire to further reinforce these important connections between scientific research and the business community in the cannabis field," said Indrajeet Chaubey, dean of the College of Agriculture, Health, and Natural Resources (CAHNR). "As a national leader in cannabis research and a land-grant university, UConn is uniquely positioned to serve as this hub, with this event being just one example of the progress and potential we seek to support." Cannabis research has become a major focus for UConn as the state considers policy and seeks advancement in related fields. Several of the University's schools and colleges joined with private companies to present to the symposium, including CAHNR, Law, Medicine, Nursing, Pharmacy, and Liberal Arts and Sciences, as well as UConn Research.

"As Connecticut's public research university, UConn is committed to being a vital resource in this new field, in every aspect from horticulture to health care to the specifics of state law," said UConn President Radenka Maric.

Sessions reflected the diversity of research and applications for cannabis. While some presenters focused on cultivation and maximizing crop output, entrepreneurs discussed the rise of dispensaries and the economic potential of a new industry. Law and policy experts offered insight as the state continues to establish rules and regulations.

DENNIS D'AMICO

Associate Professor of Dairy Foods

Move over, Wisconsin and Vermont. Connecticut's dairy industry may be small, but its artisan cheesemakers are among the most creative and talented in the country. Chief among them is Dennis D'Amico, a UConn food scientist working with students as well as small businesses to maximize the state's potential. D'Amico, an associate professor in the College of Agriculture, Health and Natural Resources, is an expert on the production of dairy products like cheese and ice cream. He helps creameries establish best practices in food safety, implementing technical and scientific knowledge to production and management systems. In addition to being an established and respected researcher in his field, D'Amico and his students have made a delicious culinary impact at UConn. The cheeses and ice cream flavors they develop are among the most creative and delectable in New England – and many of them end up for sale at the Dairy Bar, including the brand new Brown Butter Brickle. What's it like to conduct research in a field that makes people happy? Hear it in his own words.

CHECK OUT THE VIDEO FEATURE HERE!

PHARMACY RESEARCHERS DEVELOP TREATMENT FOR GLIOBLASTOMA

Courtesy of University Communications

THE COLLABORATION BETWEEN UCONN AND YALE RESEARCHERS TARGETS AN AGGRESSIVE, OFTEN DEADLY FORM OF BRAIN CANCER

A team of researchers, including those at the University of Connecticut, has developed a nanoparticle-based treatment that targets multiple culprits in glioblastoma, a particularly aggressive and deadly form of brain cancer.

The results, a collaboration between UConn and Yale University, were published in Science Advances. The new treatment uses bioadhesive nanoparticles that adhere to the site of the tumor and then slowly release the synthesized peptide nucleic acids that they're carrying. These peptide nucleic acids target certain microRNAs – that is, short strands of RNA that play a role in gene expression. Specifically, they're directed at a type of overexpressed microRNA known as "oncomiRs" that lead to the proliferation of cancer cells and growth of the tumor. When the peptide nucleic acids attach to the oncomiRs, they stop their tumor-promoting activity.

The laboratories of professors Raman Bahal of the UConn School of Pharmacy and Mark Saltzman of Yale collaborated on the treatment system. Unlike similar efforts, which target only one oncomiR at a time, this treatment targets two, making its effect on cancer cells stronger. The test mice who received the treatment lived for a significantly longer time than the control mice.

"It can knock down both targets at the same time, which turns out to have a remarkably more powerful result, as we saw with the increased survival results," says Saltzman, a professor of biomedical engineering, chemical and environmental engineering, and physiology. "These results are the best I've ever seen in this sort of aggressive brain tumor."

For this work, the researchers targeted the oncomiRs known as miR-10b and miR-21, which are both very common in glioblastoma. Future treatments, though, can be easily tailored for specific patients. For instance, if a biopsy of a patient's tumor produces a profile showing the proliferation of different oncomiRs, the treatment could be appropriately altered. Saltzman calls the treatment "a marriage of two technologies."

"One is the bioadhesive nanoparticle technology, which we had developed earlier, and marrying it to this peptide nucleic acid technology that Raman has perfected," he says.

The study's other authors include Shipra Malik '23 (Pharm.D.), a former graduate student in Bahal's lab, and Vijender Singh, Associate Director of Computational Biology Core at UConn. "This study opens new avenues for RNA-targeted technology in developing personalized therapy for brain cancer," says Malik.

A SELF-COOLING TENT THAT RUNS ON JUST WATER AND SUNSHINE

By Mac Murray

AN INVENTION FROM UCONN RESEARCHER AL KASANI MAKES CAMPING IN HOT WEATHER A BREEZE

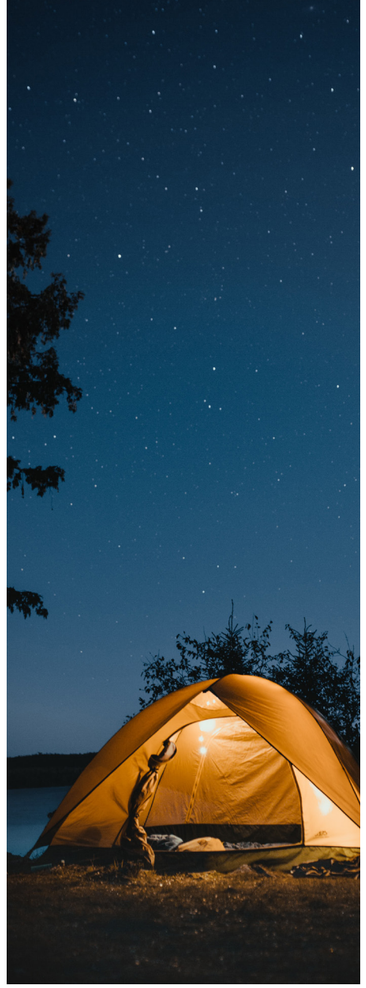
For many avid outdoorspeople, summertime and camping go hand in hand. But as climate change continues to drive summer temperatures higher, outdoor recreation could become less relaxing—and cooling technologies like fans and portable air conditioners require electricity that is seldom available at the average campsite. Seeing an unmet need, UConn researcher Al Kasani, working with Technology Commercialization Services (TCS) and the university's Center for Clean Energy Engineering (C2E2), has developed a new off-grid technology that allows a tent's internal temperature to cool up to 20°F below the ambient temperature. The tent requires just one external element to function, one that is typically found in abundance around campsites: water. A single gallon of water can power the tent's cooling technology for up to 24 hours.

"Looking into nature is the key to many of our problems. Plants wick water from the ground and then sweat to cool themselves, and they get the required energy from the sun. What I did was simply to find a material that could do the same job," Kasani says.

A proprietary fabric wicks water from a reservoir up through the entire surface area of the tent, leading to an electricity-free temperature decrease far more substantial than existing cooling technologies. The most efficient technology currently on the market, explains Michael Invernale, a senior licensing manager at TCS, is an infrared reflective tent.

"All the heat gets bounced off of an infrared reflective tent, and the best-case scenario there is that it's just as hot in the tent as it is outside," he says. "It's not any hotter, but depending on what's inside the tent versus outside, and air flow, it might still feel hotter inside the tent, even if the temperature is the same. With this new evaporative cooling technology, you can get the inside temperature down to 15 or 20 degrees cooler inside versus outside." The tent has a tiny footprint, both physically and ecologically. Its lightweight fabric makes it packable and far more portable than electric fans, and its cooling system is "powered" by endlessly repeatable reactions between water and titanium nanoparticles – eliminating emissions and utilizing renewable resources. The wide availability of titanium ensures that the tent's production will remain cost-effective for producers and affordable for consumers.

The moisture-wicking technology also has an added benefit: an air-purifying effect provided by the antimicrobial nanoparticles. "The water and the nanoparticles are undergoing a reversible reaction, over and over as the water



leaves. But the water is getting in contact with this catalytic material, and the process of that generates radicals and it will kill [infectious] material that's in and on the tent. So, it could also be considered a bit of an air cleaner," Invernale says.

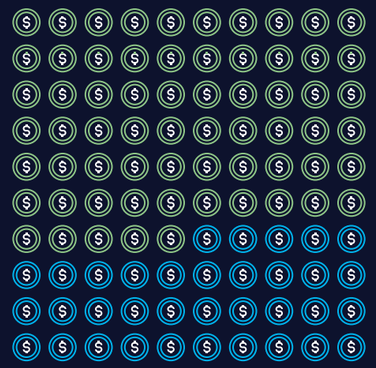
Industry interest in Kasani's technology has been high, according to Invernale, whose office assists researchers in commercializing their innovations into products that benefit society and fuel economic development. Eventually, he hopes to see the tent on the market for recreational campers, as well as foresters, military personnel, and all who could benefit from a cooler place to take shelter.

RESEARCH BY THE NUMBERS

SECOND QUARTER FIGURES FOR FY23

NEW AWARDS BY CAMPUS

Each $ Is Equivalent To 1%



STORRS/REGIONAL

$100,628,242

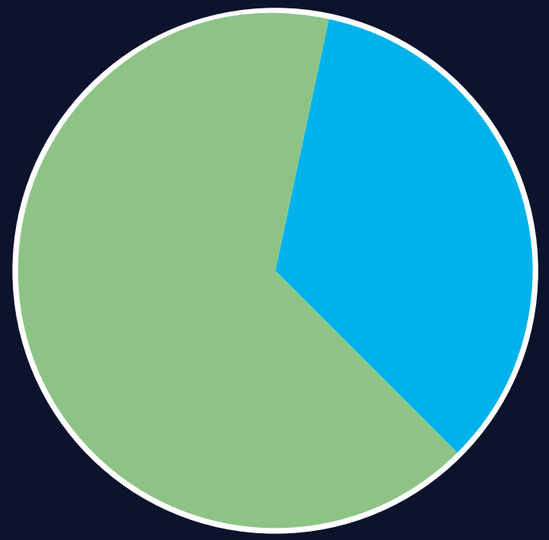
UCONN HEALTH

$55,252,960

TOTAL OF NEW AWARDS

$155,881,202

EXPENDITURES BY CAMPUS



STORRS/REGIONAL

$107,835,252

UCONN HEALTH

$54,918,173

TOTAL EXPENDITURES

$162,753,425

SHINING LIGHT ON RARE DISEASES AND RESEARCH: KRABBE DISEASE

By Lauren Woods

"WITH OUR RARE DISEASE RESEARCH, WE CAN HOPEFULLY MAKE A DIFFERENCE – THAT'S OUR DREAM," SAYS UCONN HEALTH RESEARCHER STEPHEN J. CROCKER, PH.D.

February 28 marked Rare Disease Day, and UConn Health's campus lit up in green, blue, pink, and purple to raise awareness of the more than 7,000 rare diseases and the importance of advancing research to find promising therapies and potential cures for patients. One of the many incurable rare diseases is debilitating and deadly globoid cell leukodystrophy (GLD), also known as Krabbe disease. UConn School of Medicine's Stephen J. Crocker, Ph.D., associate professor of neuroscience and immunology, has been awarded an NIH grant to gain greater insights into the genesis of Krabbe disease.

> **"Because Krabbe disease is rare, most people have never heard of it," says Crocker. "The disease's development in the brain seems to be entirely spontaneous."**

This incurable genetic disease of the central nervous system causes profound white matter loss in the brain. It affects 1 in 100,000 people, most often presenting in infants, but can also have late onset in adults too. Only a few U.S. states currently conduct newborn screening blood tests for this genetic condition. If the disease is diagnosed early, within a child's first 30 days of life, a rigorous and risky bone marrow transplant can help improve their survival odds. Unfortunately, survival from Krabbe disease is only usually within a child's first year of life, and most children with the disease die before age five.

A Surprising Research Discovery for this Rare Disease

While doing comparative single-cell RNA sequencing in a mouse model of GLD, Crocker's laboratory surprisingly uncovered that there are remarkably high levels of CD8 T immune cells present in brain and spinal cord tissues of the disease. "We have also determined that if you block these T immune cells using antibodies, you can profoundly delay the clinical disease and prevent much of the neuropathology associated with Krabbe disease," says Crocker.

The strong preliminary laboratory data findings supported a recent NIH grant application that was awarded funding. Crocker and his team will now further interrogate the role CD8 T cells play in Krabbe disease using advanced genetic profiling tools and RNA sequencing approaches. For the NIH research project, Crocker is collaborating with other immunology researchers at UConn School of Medicine, as well as collaborators at Johns Hopkins. "Research funding like this are the seeds we need for the initial first steps to help patients with rare diseases and grow our research to find future therapy solutions and cures," says Crocker.

Recent Awardees

Honorees at the March Vice President for Research, Innovation, and Entrepreneurship/Provost Award Luncheon

PI: Eleni Rodis
Co-PI: Kathryn Parr
$803,712
State Opioid Response – Department of Mental Health and Addiction Services and Research

PI: Joseph Ercolano
$1,384,984
Small Business Development Center, FY23

PI: Emily Wilson
Co-PIs: Anita Morzillo and Qian Lei-Parent
$304,661
Trails and Active Living Program, Department of Energy and Environmental Protection (DEEP)

Land Cover Comparison, EPA/CT DEEP

PI: Yi Li
$749,965
Cas9-mediated Development of Dwarf, Super-root, and Early Germination Perennial Ryegrass and Tall Fescue

PI: Yuanyuan Zhu
$596,736
NSF CAREER: Mechanistic Understanding and Strategies to Improve the Regeneration of Supported Nickel Catalysts for Methane Conversion

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