

# FISCAL YEAR 2022 STEWARDSHIP REPORT



Ivy Brain  
Tumor Center

Barrow  
Neurological Foundation

## FOCUSED ON **FINDING A CURE** FOR BRAIN CANCER



**13**

new clinical trials  
opened



**2,500+**

patients screened  
and treated



**25+**

biopharma company  
collaborations

Thanks to the generosity of Barrow Neurological Foundation donors, we are fast approaching this goal. Our team of brain tumor specialists is dedicated to innovative research to accelerate the discovery of new, more effective drugs for brain cancer while providing unparalleled care to patients.

“We call this an incurable disease, but there are always exceptions, and we’re here to make everyone that exception,” says Nader Sanai, MD, director of the Ivy Brain Tumor Center. The Ivy Center personalizes brain tumor therapy, where the molecular underpinnings of each unique patient dictate their course of treatment. Patients come to us from around the world to gain access to our array of clinical trials, finding treatment options when they have been told there are none.

## CREATIVE SCIENTIFIC **STRATEGIES**



The Ivy Brain Tumor Center is committed to pushing boundaries in brain cancer research and treatment. We conduct cutting-edge, experimental research never seen before in the field of brain cancer research. As the largest Phase 0 clinical trials program in the world, we are pioneering a novel approach that bucks decades of precedent – accelerated, early-phase clinical trials that quickly identify drugs that deliver on their promise, while also rapidly eliminating those that do not.

Recently, we dosed the first patient worldwide in a Phase 0 clinical trial of sonodynamic therapy, a new modality that uses MRI-guided focused ultrasound to selectively activate a newly developed brain tumor drug. This groundbreaking study creates a noninvasive treatment option for patients with recurrent glioblastoma and other high-grade gliomas. It also overcomes the most challenging part of treating brain cancer, breaking through the protective shell around the brain, called the blood-brain barrier.

The study's initial results have been positive, identifying sonodynamic therapy as a promising new tool for brain tumor patients. These data warranted expansion of the clinical trial to more patients and with a variety of new device modifications. As part of this expansion, the Ivy Center is also leading the world's first clinical trial of sonodynamic therapy in children, treating the brainstem tumor Diffuse Intrinsic Pontine Glioma (DIPG), an extremely aggressive pediatric tumor with almost no therapeutic options.



**“Sonodynamic therapy has tremendous potential to become a new nonsurgical therapeutic modality to treat brain tumors in adults and children.”**

Nader Sanai, MD



### **SONODYNAMIC THERAPY**

See the culmination of research and innovation as the first patient is treated in this first-in-human study.



[Learn More](#)

## CULTIVATING A CULTURE OF HOPE

In addition to pacesetting science, the Ivy Brain Tumor Center is always pushing to improve patients' quality of life. Our team of scientists, clinicians, and staff find new ways to cultivate hope that can help sustain patients, families, and caregivers facing an unimaginable challenge. In all that we do, we embrace a patient-first perspective.

When Ingrid Leon learned her glioblastoma had returned, doctors said there was no more that could be done. Seeking new options and a sliver of hope, the Leon family, based in Merida, Yucatan, in Mexico, began searching worldwide. A family friend, who was previously treated by Dr. Sanai and is now a 10-year glioblastoma survivor, referred them to the Ivy Center. Here, they learned that Ingrid was a candidate for an Ivy Phase 0 clinical trial. She began her experimental treatment and underwent a safe and successful surgery to remove her tumor. The Leon family continues to bravely push ahead, knowing that Ingrid's personalized care and experimental therapy options at the Ivy Center may not only keep the tumor in check, but will also improve her quality of life.

Dalton Riddle also found himself out of options. The young Wyoming man needed a second opinion on his aggressive glioblastoma. He was referred to the Ivy Center and permanently relocated to Arizona for treatment. Dalton enrolled in a clinical trial and began a new experimental therapy that is showing promise. He'll soon celebrate three years since his initial diagnosis and has become an ambassador for the Ivy Center, offering advice and encouragement to other patients and often recommending they come here for care. While Dalton knows his battle with glioblastoma is not over, as these tumors often recur, he's not losing hope and feels supported and well-cared for by the Ivy Center team.



[Learn More](#)

### RUN FOR A CURE

Join the fight against brain cancer by participating in the Annual Phoenix Head for the Cure 5K Walk/Run.

Funds raised will benefit brain cancer research and clinical trials at the Ivy Center.



# BIOTECH AND BIOPHARMA INDUSTRY PARTNERSHIPS

Brain tumor patients have not seen a new FDA drug approval in nearly 20 years. The Ivy Brain Tumor Center and our pharmaceutical industry partners are rising to this challenge. Every day, Ivy Center scientists work with industry scientists to rapidly identify and accelerate new drugs for development.

Our industry-engagement model is paradigm-shifting, helping us engage more new drug development partners than any other program in the world. Companies small and large know that when the Ivy Center selects their drug as a development candidate, we will pay for all laboratory and clinical trial expenses, as well as convey to them all intellectual property related to our efforts. These incentives tilt the tables for potential biotech or biopharma partners, encouraging them to open their new drug portfolios to our brain tumor patients first. In return for our investment, we get access to drugs that are otherwise unavailable and without any restrictions on our ability to share our findings with the greater scientific community.

Our partnership with the multinational pharmaceutical company AstraZeneca exemplifies this symbiosis. The Ivy Center is the first program worldwide to test their new drug AZD1390, an ATM kinase inhibitor, in a Phase 0 study of patients for recurrent glioblastoma. The study is assessing whether the drug can enhance the effects of radiation treatment by blocking cancer's ability to resist radiation-induced DNA damage. AZD1390 is a unique "designer" drug developed specifically to cross the blood-brain barrier and target an essential element in the cancer cell machinery. Because of Barrow Neurological Foundation donors, the Ivy Center can underwrite research efforts needed for our patients to be first-ever recipients of this promising new drug.

 **NALASENSE** Soundly  
Conquering  
Cancer

 **Karyopharm**  
Therapeutics

**AstraZeneca** 

**Vvace**  
therapeutics

**gsk**

**QED**  
therapeutics  
a biovista company

 **Salaris**  
PHARMACEUTICALS

**BEIGENE**  
TEN YEAR ANNIVERSARY

**bridgebio**



## MENTORING THE NEXT GENERATION OF SCIENTISTS AND CLINICIANS

The Ivy Brain Tumor Center's ambitious timetable and world-class research environment resonate with young, aspiring investigators. Since our inception, we have taken these youth under our wings, from high school and undergraduate students to neurosurgical trainees and postdoctoral fellows.

The opportunity to intern at the Ivy Center is a coveted position at any level. Students and trainees work shoulder-to-shoulder with senior investigators to plan and execute cutting-edge neuroscience. This type of collaboration and hands-on experience fuels their ambitions to pursue a career in science and medicine, paving the road for a new generation of scholars to treat brain cancer and help patients and families.

Kamal Shaik, an undergraduate at Arizona State University, joined the Ivy Center as a Summer Intern and intensively pursued work on evaluating a panel of FGFR inhibitors for their normal brain and brain tumor distribution with Dr. Tovmasyan. His tenure was so successful that he was invited to remain with us throughout the subsequent year as an Ivy Center Intern. He is completing his senior biomedical thesis with us as part of Arizona State University's Barrett Honors College Program.

Neurosurgery residents at Barrow have special access to advanced training opportunities at the Ivy Brain Tumor Center. Dr. Charuta Furey is a fifth-year neurosurgery resident who completed her medical degree at Yale following an undergraduate degree at Harvard. Dr. Furey is helping lead the Ivy Center's new Liquid Biopsy Program. As part of this new initiative, the first of its kind for brain tumor patients worldwide, a small, customized reservoir is inserted under the scalp, connected to a micro-catheter strategically placed within the tumor surgical cavity. At routine clinic visits, Dr. Furey safely accesses the reservoir and extracts small amounts of cerebrospinal fluid. Each sample enables our team to analyze tumor-specific genetic materials, identify tumor evolution, and track its resistance mechanisms to new drug therapies. Through this experience at the Ivy Center, Dr. Furey is positioning herself as a rising star in neurosurgery and in the field of brain tumor drug development.

"We are committed to preparing the next generation of bioscience leaders," says Shwetal Mehta, PhD, deputy director of the Ivy Center. "Our culture of excellence introduces young, bright minds to innovative ideas and provides opportunities for professional and personal growth."

The Ivy Center team currently includes 10 postdoctoral fellows and 16 research technicians, with an average age of 30. In addition, 50% of these young scholars are women, bolstering the underrepresented proportions of women in science and medicine.



### SUMMER VOLUNTEER PROGRAM

High school students 16 years and older can apply for an opportunity to volunteer within the Ivy Brain Tumor Center, participating in laboratory research under the mentorship of an Ivy Center specialist. The program runs annually throughout July.



[Learn More](#)

# SCIENTIFIC COMMUNITY ENGAGEMENT



As the largest Phase 0 clinical trials program in the world, the Ivy Brain Tumor Center routinely leads new presentations of our progress at national and international conferences. The greater scientific community and global brain tumor patient population benefit from our innovative scientific and clinical approaches, learning from us which drugs hold the greatest promise.

## ● **Chicago, Illinois**

The American Society for Clinical Oncology (ASCO) is the largest clinical cancer meeting in the world, convening 36,000 clinicians and investigators annually. Here, the Ivy Center announced our initial results of a dual-drug cocktail Phase 0 clinical trial using two new agents developed by the biopharmaceutical company Eli Lilly. This promising data identified select patients who demonstrated exceptional penetration of their tumors by both drugs simultaneously. This was the first-ever Phase 0 clinical trial simultaneously testing a two-drug combination in glioblastoma. Dr. Sanai states, "Our strategy is to identify agents that overcome the roadblock of the blood-brain barrier and build upon those agents in multi-drug combinations."

## ● **Boston, Massachusetts**

The Society for Neuro-Oncology annual meeting is the largest conference worldwide dedicated to brain cancer research, attracting over 2,600 researchers and clinicians from far and wide. Ivy Center specialists presented an impressive 11 new studies to this community, with presentations from principal investigators Dr. Nader Sanai, Dr. Shwetal Mehta, Dr. An-Chi Tien, and Dr. Artak Tovmasyan; postdoctoral fellow Dr. Tigran Margaryan; ASU-BNI graduate student Dr. Costanza Lo Cascio; and Research Specialists Anita DeSantis, Sarah Himes, and James McNamara.

## ● **Paris, France**

The largest and most influential cancer research meeting for Europe, Asia, and the Middle East is the annual congress of the European Society for Medical Oncology. In a crowded auditorium, Ivy Center investigators announced initial results of our Phase 0 clinical trial of the BeiGene drug pamiparib in newly-diagnosed and recurrent glioblastoma. This interim analysis demonstrated that pamiparib is safe, capable of penetrating the blood-brain barrier, and hits its genetic target with unprecedented efficacy. The results were not only of interest to investigators developing new glioblastoma therapies, but also to oncologists treating patients with metastatic brain tumors, who also can receive this drug.



## BUILDING ON SUCCESS

The under-construction Ivy Brain Tumor Center global headquarters will soon shine as a beacon of hope for brain tumor patients worldwide. Scheduled to open in the fall of 2023, this five-story, 75,000-square-foot building will be the world's largest research center dedicated to brain tumor drug development. Devenney Group designed the new facility to enable cross-disciplinary communication, providing a technologically advanced home for scientists, investigators, clinicians, and operational staff to focus on treating our patients and unraveling this difficult disease. In addition to its laboratories, this building includes specialized areas for clinical trials infrastructure, multidisciplinary clinical consultation, MR imaging, targeted radiotherapy, and scientific seminars.

"Our new home will be the largest dedicated space for brain cancer research worldwide, and it will be committed to the singular goal of finding therapies that work for this patient population," says Nader Sanai, MD, director of the Ivy Center.

The new Ivy Center headquarters, being built by Okland Construction, includes a distinct glass façade and, internally, layers of transparent walls to provide clinic patients a look at our scientists and laboratories as they actively work towards a cure.



**"It will be a beacon of hope for brain tumor patients and their families who feel that brain cancer research is due for a breakthrough, like many other cancers in recent history."**

Nader Sanai, MD

### GET AN INSIDE LOOK

View a live surgery or take a tour of the Ivy Center's state-of-the-art research facility while hearing from our brain tumor experts and learning how Ivy Phase 0 clinical trials are delivering new treatment options for patients.

Email [info@ivybraintumorcenter.org](mailto:info@ivybraintumorcenter.org) to be added to the guest list.



Learn More





## **NADER SANAI, MD**

Dr. Sanai, director of the Ivy Brain Tumor Center, is an internationally-recognized neurosurgical oncologist with clinical and research expertise in the treatment of all brain tumors.

## **THANK YOU** FOR YOUR SUPPORT

In just four years, the Ivy Center has engaged more than 2,500 patients with incurable brain tumors. Our clinical trials have broken scientific barriers and inspired a generational shift in the world's approach to brain tumor drug development. It is hard to overstate your importance to this objective. We rely on generous donors like you to reach people suffering from brain cancer worldwide.

On behalf of the entire Ivy Brain Tumor Center team, we thank you for your support and helping us get closer to our goal of finding a cure for brain cancer.

With Gratitude,  
Nader Sanai, MD  
Director, Ivy Brain Tumor Center

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Ivy Brain Tumor Center at Barrow Neurological Institute in Phoenix, AZ is a non-profit translational research program that employs a bold, early-phase clinical trials strategy to identify new treatments for aggressive brain tumors, including glioblastoma. The Ivy Center's Phase 0 clinical trials program is the largest of its kind in the world and enables personalized care in a fraction of the time and cost associated with traditional drug development. Unlike conventional clinical trials focusing on single drugs, the Ivy Center's accelerated trials program tests therapeutic combinations matched to individual patients.

**Barrow**  
Neurological Foundation

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