



Dear Friends, Board Members, and Supporters of the Harold E. Eisenberg Foundation:

The Robert H. Lurie Comprehensive Cancer Center of Northwestern University is leading efforts to translate life-changing research into better ways to prevent, diagnose, and treat cancer. Collaborating across disciplines, our physicians and scientists combine scientific discovery and medical expertise to provide the highest level of innovative, patient-centered care.

We persevere in our goal to raise \$100 million in philanthropic dollars—all to bring our highly innovative research, training, and community impact efforts to the next level of “exceptional” for our patients in Chicagoland and worldwide.

The Harold E. Eisenberg Foundation’s longstanding partnership has enabled us to advance our Gastrointestinal (GI) Oncology Program and Harold E. Eisenberg Foundation GI Cancer OncoSET Program. We are proud to continue to offer Harold E. Eisenberg Research Scholar Awards—our most recent recipients are Arthur Prindle, PhD, and Devalingam Mahalingam, MBBChBAO. This seed funding is a tremendous resource for our investigators who are endeavoring to develop new areas of research in the field of GI cancers.

It is our pleasure to share the following report with details on how your support is making an impact in the lives of our investigators, nurses, and patients all involved in our breakthrough research.

As Lurie Cancer Center and the Division of Hematology and Oncology look forward to expanding our capabilities and intensifying our efforts to defeat cancer as a disease, we remain grateful for the Harold E. Eisenberg Foundation’s loyal commitment to our work.

With gratitude,

Leonidas C. Platanias, MD, PhD

Jesse, Sara, Andrew, Abigail,
Benjamin, and Elizabeth
Lurie Professor of Oncology
Director, Lurie Cancer Center



Al B. Benson III, MD, FACP, FASCO

Professor of Medicine (Hematology
and Oncology)
Associate Director, Cooperative
Groups, Lurie Cancer Center



Harold E. Eisenberg Foundation GI Cancer OncoSET Program

OncoSET

OncoSET harnesses the power of precision medicine to identify tailored therapies for patients based on the abnormal genes specific to their tumor. The Harold E. Eisenberg Foundation GI Cancer OncoSET registry continues to enroll patients with GI malignancies. A total of 483 patients have enrolled consisting of esophagus, pancreas, stomach, liver, small intestine, colorectal, and anal cancer. This past year, there have been 59 newly enrolled GI patients, aiding in the goal of achieving personalized medicine in cancer care.

Cases in OncoSET Registry

Category	# of Patients
Gastrointestinal-Anus	11
Gastrointestinal-Colon	136
Gastrointestinal-Esophagus	37
Gastrointestinal-Liver	32
Gastrointestinal-Other digestive organ	84
Gastrointestinal-Pancreas	100
Gastrointestinal-Rectum	50
Gastrointestinal-Small intestine	10
Gastrointestinal-Stomach	23
Grand Total	483
Date Range: January 1, 2017-April 30, 2022	

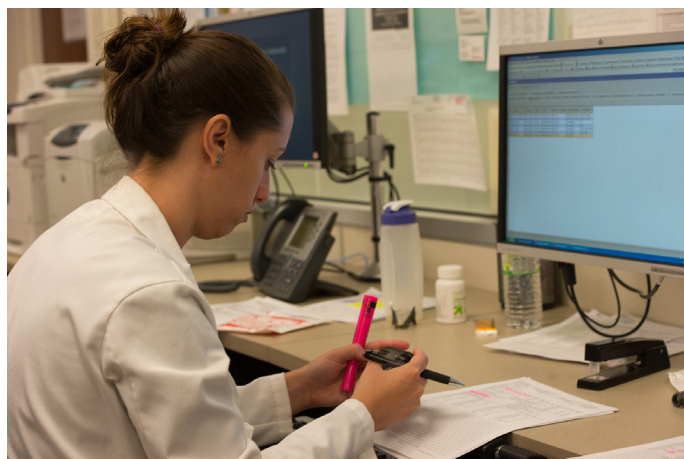
Clinical Trials Update

In the past year, there have been 115 GI patients accrued to correlative, diagnostic, supportive care, and treatment trials at Lurie Cancer Center. The majority of these patients have been enrolled to treatment trials that include Phase I, II, III, and pilot studies. A total of 66 trials have been open to accrual. Also, we have added our Northwestern Medicine West Region (Central DuPage and Delnor Hospitals) as network sites for our National Cancer Institute trials so that patients can have access to novel therapies closer to home.

Spotlight on GI Oncology Research Nurses

Kristen Hanauer, RN, MSN, and Sakina Bharmal, RN, work as clinical research nurses for the Clinical Trials Office of Lurie Cancer Center. They assist in identifying and enrolling patients with gastrointestinal cancers to clinical trials, as well as caring for patients enrolled to clinical trials. Kristen and Sakina extend their heartfelt gratitude to the Harold E. Eisenberg Foundation for the generous patient care packages.

"We thank the Harold E. Eisenberg Foundation for their thoughtful and generous care packages, which are much appreciated by all recipients!"



Focus on Precision Medicine

Science and technology are driving big changes in the way we treat cancer, and our clinical research program has strong ties to the field of precision medicine. The field of cancer medicine seems to be gravitating in this direction more broadly, too. Lurie Cancer Center has internal capabilities and is also partnering with select technology companies that are helping to make precision medicine a reality by gathering and analyzing clinical and molecular data on much larger scale, working with cancer centers across the nation and globally.

Over the past few years, Lurie Cancer Center has partnered with technology companies in the area of GI cancers, specifically colon cancer. Using the Harold E. Eisenberg GI Cancer Tissue Bank, these partners have helped complete next-generation sequencing of 500+ of our colon cancer cases. With these results, our physicians and scientists will have both pathology and genomic characterizations of 500+ colon cancer samples. The data are compiled by our

Bringing Breakthroughs to Patients

Cancer Informatics team and our Quantitative Data Science Core Facility and then used by investigators to help guide new research questions.

In addition to the next-generation sequencing, Lurie Cancer Center has collaborated to create organoids from gastrointestinal cancer over the past couple of years. Organoids provide a detailed view of how organs form and grow, which can also provide new insights on human development, disease, and treatment options. Drug interaction with these “mini-organs,” can potentially revolutionize the field of drug discovery and open new approaches to personalized medicine.

Over the past year, we have begun creation of Tissue MicroArrays (TMA) of colon cancer cases with next-generation sequencing data, various clinical data, and outcomes. Tissue MicroArrays contain small representative tissue samples from potentially 700+ cases within the same paraffin tissue block that allows high throughput analysis of multiple patient tissue samples at the same time. MicroArrays have various uses including analysis of diagnostic, prognostic, and new treatment predictive biomarkers.

These collaborative efforts would not have been possible without the Harold E. Eisenberg Foundation Tissue Bank, which provided many of the tumor samples for this forward-thinking partnership.

Colorectal specimens collected for the Harold E. Eisenberg Foundation Tissue Bank were distributed, supporting the research projects of Dr. Guang-Yu Yang within the past year. While our overall accrual decreased over the past two years due to the COVID-19 pandemic, we are now back to full operation.

26,764

specimens
in tissue bank

1,493

patients
contributed

Research Scholar Update

Through the prestigious Harold E. Eisenberg Research Scholar Award, our dedicated scientists can continue to explore new ideas aimed at discovering cures for GI cancers.

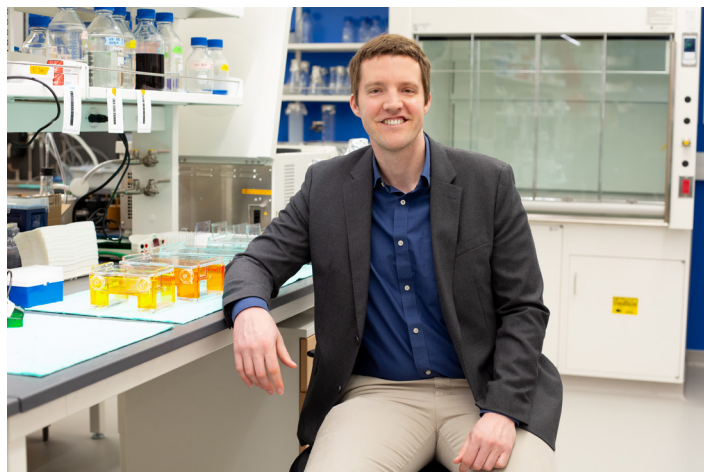
Arthur Prindle, PhD

2022 Scholar

Area of focus: Inflammatory bowel disease therapy

Probiotics are microorganisms that have beneficial properties for the host. Recent advancements have demonstrated that probiotics can be used to treat a variety of gastrointestinal disorders. The idea that microbes can be used as therapeutics, combined with advancements in genetic engineering in living cells, raises the possibility that engineered “smart probiotics” could be used as novel living diagnostics and therapeutics for improving digestive health.

Currently, Dr. Prindle and his colleagues have designed a living microbial diagnostic using the probiotic E. Coli Nissle 1917 programmed to recognize inflammatory biomarkers that are elevated during inflammatory bowel disease (IBD). They plan to test these probiotics initially using human stool samples to determine whether they can differentiate stools of patients with active IBD and those of patients without IBD. Overall, these engineered “smart probiotics” have the potential to become a living medicine that can sense inflammation within the patient and respond at the site of disease while minimizing systemic side effects and invasive procedures. Identifying active IBD and intervening to control the disease is an important effort to reduce the risk of colon cancer in these individuals.



Dr. Prindle in his laboratory

Investing in Top Scientists

Research Scholar Update *continued*

Devalingam Mahalingam, MBBChBAO

2021 Scholar

Area of focus: Metastatic colorectal cancer therapy



Mutations in BRAF are present in approximately eight to ten percent of patients with metastatic colorectal cancer. BRAF is a human gene that encodes a protein called B-Raf. This protein plays a role in cell growth by sending signals inside the cell promoting, among other functions, cell division. Combination BRAF + EGFR inhibitors are now the standard approach to treat B-Raf mutated colorectal cancer following progression on systemic chemotherapy. Unfortunately, these therapies produce a response that is short-lived and likely related to acquired resistance.

Funds from the Harold E. Eisenberg Foundation aided Dr. Mahalingam and his colleagues with development of a clinical protocol that evaluates if the addition of hydroxychloroquine to standard encorafenib and cetuximab therapies (BRAF + EGFR inhibition) in metastatic colorectal cancer would lead to improved efficacy. Pandemic challenges have led to a delayed activation of this clinical study, but there is now a clinical protocol moving through the regulatory process at Northwestern University, with an expected activation in October 2022 that would allow patient enrollment.

Our cancer program at Northwestern Memorial Hospital is ranked #6 in the nation—and #1 in Illinois and Chicago.

Past Research Scholar Updates

Beatriz Sosa-Pineda, PhD

2020-2021 Scholar

Area of focus: Immunotherapy for pancreatic cancer



Pancreatic ductal adenocarcinoma (PDAC) has one of the worst cancer survival rates worldwide. Tumor heterogeneity, lack of early detection, and limited therapeutic options are major challenges to overcome. Dr. Sosa-Pineda seeks to understand how the unique biological repertoire of distinct PDAC subtypes impacts tumor development and metastasis. This information is crucial to design appropriate diagnostic methods and better treatments. She is interested in dissecting the role of the transcription factor ONECUT2 in PDAC. ONECUT2 function is important in many aggressive cancers and ONECUT2 is highly expressed in metastatic PDAC of the “classical” subtype. With support of this award, Dr. Sosa-Pineda was able to inactivate the function of ONECUT2 in human pancreatic cancer cells and generated sufficient preliminary data for an R01 grant proposal that unfortunately was not funded. The study has been temporarily paused since the postdoc working on this project returned to her home country. Dr. Sosa-Pineda is in the process of recruiting new personnel to continue the study.

Hidayatullah G. Munshi, MD

2020-2021 Scholar

Area of focus: Immunotherapy for pancreatic cancer



While immunotherapy has become the standard-of-care therapy for many solid tumors, pancreatic cancer remains refractory to the currently approved immunotherapy drugs. Dr. Munshi and colleagues have been using mouse models to identify small molecule inhibitors that increase tumor infiltration by cancer-fighting T-cells. They recently published that targeting MNK kinases using small molecule inhibitors enhances CD8+ T cell infiltration (Pham et al., *JCI Insight*, 2022). They also showed that MNK inhibitors enhance the efficacy of immunotherapy in mouse models of pancreatic cancer. In parallel, they showed using slice cultures of human pancreatic tumors that have MNK inhibitors have similar effects on immune cells in human pancreatic tumor specimens. To continue this research and identify additional therapies, Dr. Munshi and his group recently received an R01 grant from the National Institutes of Health/National Cancer Institute.

Investing in Top Scientists

Zhuoli Zhang, MD, PhD

2019-2020 Scholar

Area of Focus: Pancreatic cancer therapy



Dr. Zhang is currently a faculty member at the University of California, Irvine, and serves as director of the Translational Imaging Lab. While at Northwestern and with support of the Harold E. Eisenberg Foundation's award, Dr. Zhang worked to optimize clinically translatable MRI approaches to amplify immune responses of combination therapy of dendritic cell vaccine and irreversible electroporation treatment. He received research grants from the Society of Interventional Radiology and National Institutes of Health. Dr. Zhang published articles in prestigious journals such as the *American Journal of Cancer Research*, *Cancer Imaging*, *Cytotherapy*, and others. Additionally, Dr. Zhang used the Harold E. Eisenberg data as preliminary data to support two National Institutes of Health applications, and he will hear if they were funded in November 2022.

Sui Huang, MD, PhD

2018-2019 Scholar

Area of Focus: Using a molecule created in her lab to treat liver cancer



Dr. Huang is investigating a molecule her lab created, called MEAN. Dr. Huang hypothesizes that MEAN, which stands for 6-methoxyethylaminonumonafide, may be an effective way to treat liver cancer. Dr. Huang accomplished the project and is submitting grants to seek additional funding to build upon the results from this research.

Ronen Sumagin, PhD

2017-2018 Scholar

Area of Focus: Investigating the connection between inflammation and cancer



In this study, Dr. Sumagin and his colleagues demonstrate that neutrophils migrating into developing colon tumors can shape the way cancer cells repair broken DNA. By doing so, neutrophils affect progression of colorectal cancer and its response to commonly used treatments known as DNA-repair targeted therapy. The project was completed, and the results were published in *Gastroenterology*, a very high-impact and prestigious journal. Dr. Sumagin's initial findings garnered an American Cancer Society grant of approximately \$800,000.

Guang-Yu Yang, MD, PhD

2016-2017 Scholar

Area of Focus: Gene mutation profiling of colorectal cancer



Through a large patient cohort study, Dr. Yang and his colleagues identified the unique profile of genetic alteration in young colorectal cancer patients. Specifically, the Braf mutation and Lynch syndrome are among the common genetic alterations in this group of patients. Dr. Yang's group published their work last year in the journal *Human Pathology*. Dr. Yang also worked with Shannon M. Lauberth, PhD, associate professor of Biochemistry and Molecular Genetics, on a National Institutes of Health program grant proposal focusing on colorectal cancer, and with Bin Zhang, MD, PhD, professor of Medicine (Hematology and Oncology) and Microbiology-Immunology on a proposal on immunity and colon cancer (focusing on Braf mutation/Lynch syndrome and h-mutant burden colon cancer).

Thank You for Your Generosity

The Harold E. Eisenberg Foundation is an invaluable partner in helping us to propel our GI oncology program and our efforts to provide patients with personalized medicine. Northwestern University Feinberg School of Medicine and the Robert H. Lurie Comprehensive Cancer Center of Northwestern University remain grateful for all that you do to raise awareness and funds to advance life-saving cancer medicine. If you would like more information regarding this report or Lurie Cancer Center, please contact:

Nicole Langert

Director, Major Gifts

Development and Alumni Relations

Northwestern University Feinberg School of Medicine

P. 312-503-1656; E. nicole.langert@northwestern.edu

