Indiana University Melvin and Bren Simon Cancer Center

20 15 SCIENTIFIC REPORT

Executive committee

PATRICK LOEHRER SR., MD | Director





MARK KELLEY, PhD | Associate Director of Basic Science Research

SHERIF FARAG, MBBS, PhD | Associate Director of Clinical Research





HARIKRISHNA NAKSHATRI, BVSC, PhD | Associate Director of Education

VICTORIA CHAMPION, PhD, RN | Associate Director of Population Science Research





DOUGLAS SCHWARTZENTRUBER, MD Associate Director of Clinical Affairs System Medical Director, IU Health Cancer Services

MICHAEL DARLING, MHA | Associate Director of Administration



MISSION

The mission of the IU Simon Cancer Center is to eliminate cancer's burden in Indiana and beyond.

WHAT MAKES THE IU SIMON CANCER CENTER UNIOUE?

The IU Simon Cancer Center is Indiana's only National Cancer Institute (NCI)-designated cancer center that provides patient care, and is one of only 69 in the nation. The NCI-designated Cancer Centers Program recognizes centers around the country that meet rigorous criteria for world-class, state-of-the-art programs in multidisciplinary cancer research. These centers put significant resources into developing research programs, faculty and facilities that will lead to better approaches to prevention, diagnosis and treatment of cancer. The NCI designation not only recognizes excellence but opens doors to greater federal funding, information sharing and resources.



From the director

A year ago in this column, I had the delight of writing about the renewal of our National Cancer Institute (NCI) designation. It was especially noteworthy because the five-year grant, totaling \$7.8 million, was an increase of 20 percent from the previous award in 2008. That was definitely worthy of celebration, especially since the trend nationally is to reduce research funding.

With much pleasure, I now have the opportunity to brag again because our esteemed D. Wade Clapp, MD, is leading one of the NCI's highly competitive and coveted projects known as SPORE, Specialized Programs of Research Excellence. This SPORE is the first to focus on pediatric cancers. This is important because Dr. Clapp and his colleagues from other leading academic centers will develop new treatments primarily for children who are afflicted with neurofibromatosis type 1 (NF1).

Dr. Clapp, a neonatologist, is internationally recognized for his NF1 research, a crippling tumor-creating disorder. He led a team that developed the first promising, non-surgical treatment for this disease, and his research has resulted in several breakthrough clinical trials. Dr. Clapp's stellar team includes cancer center members Jamie Renbarger, MD; Kent Robertson, MD, PhD; and Lang Li, PhD; and Tatiana Foroud, PhD, of the IU School of Medicine. You'll learn more about this SPORE in this report.



Also, you'll meet Lois Travis, MD, ScD, and Roberto Pili, MD, two recent recruits to the IU Simon Cancer Center who add breadth to our already strong team of 200+ investigators. An internationally recognized expert on cancer survivorship, Dr. Travis is in a unique position to develop such a program. She will tap into the world's largest longitudinal database of testicular tumor samples, which is housed here at IU. Dr. Pili is nationally recognized for his expertise in prostate, renal and bladder cancers. He'll focus on prostate cancer as he develops a genitourinary research program.

Two other new recruits include Richard Zellars, MD, and Mark Geraci, MD. Dr. Zellars, a breast cancer researcher, chairs the Department of Radiation Oncology, while Dr. Geraci, a pulmonologist and lung cancer researcher, is now the chair of the Department of Medicine. Both are outstanding physician scientists, and they will play important roles in strengthening the cancer center.

Sadly, we said farewell to the incomparable David Flockhart, MD, PhD, who passed away on Thanksgiving Day 2015. Dr. Flockhart, a member of the cancer center and director of the Indiana Institute for Personalized Medicine, was an internationally renowned researcher and physician. He transformed care for patients by personalizing treatments and making medications safer and more effective. He became one of the world's foremost authorities on drug interactions and reactions. Dave died a little more than a year after being diagnosed with glioblastoma multiforme, an aggressive form of brain cancer. He took the opportunity to make his disease a teachable moment by going public with his diagnosis by delivering lectures and letting the local National Public Radio affiliate chronicle his journey.

His death serves as a reminder of the important work ahead of us. Progress against cancer is made in incremental steps, which for far too many, doesn't happen quickly enough. Speaking for all of us at the IU Simon Cancer Center, we are dedicated to decreasing the burden of cancer worldwide.



Patrick J. Loehrer, Sr., MD H.H. Gregg Professor of Oncology Director, IU Simon Cancer Center Associate Dean for Cancer Research Indiana University School of Medicine





improve quality of life



By Michael Schug

Lois B. Travis, MD, ScD, is on a mission. Her mission is to improve the quality of life for cancer survivors.

Travis, an internationally recognized expert on cancer survivorship, has been focused on leading the development of a new survivorship research program at the IU Simon Cancer Center since she came on board in July. For two decades, Dr. Travis conducted survivorship research at the National Cancer Institute (NCI) and was on the inaugural steering committee of the institutes' Office of Cancer Survivorship.

The new IU program will include research to predict which patients are most susceptible to the toxicities of cancer treatment, with an aim to eventually alter treatment or develop preventive measures to protect the patient from long-term adverse side effects. This ground-breaking initiative has the potential to impact the nearly six million people worldwide who are eligible to receive platinum-based chemotherapy each year for more than a dozen types of cancer.

Lawrence H. Einhorn, MD, IU Distinguished Professor and Livestrong Foundation Professor of Oncology at the IU School of Medicine, revolutionized cancer treatment more than 40 years ago when he combined cisplatin with two additional drugs. The combination became the cure for testicular cancer. However, for many survivors, they suffer adverse side effects such as hearing loss, neuropathies and other health issues from their cancer treatments.

Dr. Travis, the Lawrence H. Einhorn Professor of Cancer Research at the IU School of Medicine, is determined to reduce the cost of the cure. As an example, Dr. Travis said, "The cost of the cure for a woman with Hodgkin's lymphoma should not be an increased risk of developing breast cancer. That's unacceptable. My mission in life is to improve the quality of life for cancer survivors. I am very clear about that and have been for many years. Our team at Indiana will do it."

The bulk of the new program's research will come from a National Institutes of Health (NIH) study, of which Dr. Travis is the principal investigator. Open at the IU Simon Cancer Center and other sites around the nation and Canada, the trial aims to identify genetic variants associated with cisplatin-related toxicities as the first step in developing preventive strategies for patients.





The trial will focus on testicular cancer patients previously treated at the IU Simon Cancer Center and other major cancer centers. This group of patients is ideal to address these particular research questions, given their young age at diagnosis, curability, and relative uniformity of cisplatin-based chemotherapy. Plus, IU has the largest longitudinal database in the world of testicular cancer survivors, allowing researchers to track quality of life and discover how they can improve survivorship.

"The platinating agents are the most commonly used group of cytotoxic drugs in the world," Dr. Travis said. "That's why this NIH-funded study is so critical to the field.

"Once we have established the genetic basic and other risk factors for various toxicities, we will be able to eventually develop preventive agents and interventions to decrease the costs of the cure. In the future, it is our goal that patients will not be troubled by the types of side effects that they now have."

Dr. Einhorn added: "Our hope is that by using modern technology with the translational genomics expertise that Dr. Travis brings to us and the talent we have here within epidemiology, informatics and other areas, that we can look at thousands of patients. We'll not just look at prevalence but identify problems and solve these problems so that our patients will live longer and better as they did in the 1970s when we developed better anti-nausea medications."

DREAM BECOMES REALITY: New oncology institute opens in **RENY**



By Brian Hartz

More than a decade ago,

Patrick Loehrer, Sr., MD, traveled to Kenya. He returned with a dream.

Although more developed than other African nations, Kenva was by no means immune to the challenges of delivering healthcare to those in rural, resource-limited communities. The HIV/AIDS pandemic continues to ravage the country and chronic diseases, such as cancer, are on the rise. Tens of thousands of people still desperately need treatment.

In response to the increasing cancer cases, Dr. Loehrer, director of the Indiana University Melvin and Bren Simon Cancer Center, co-founded the Academic Model Providing Access to Healthcare (AMPATH) Oncology Institute in 2009 to help build a sustainable oncology health care system in western Kenya where none previously existed.

Dr. Loehrer's dream, however, did not become fully realized until 2015, when AMPATH's new outpatient clinic in Eldoret, known as the Chandaria Cancer and Chronic Diseases Centre, opened its doors. Prior to its

construction, chemotherapy had been conducted in a tent. Now, Kenyans will be treated in a gleaming, state-ofthe-art, four-story facility that will be the largest building on the Moi Teaching and Referral Hospital campus.

The facility is already screening about 1,000 patients per month for breast and cervical cancer, the latter of which is the leading cause of cancer death among all Kenyans. "This will be the first public facility dedicated to treating people with cancer in western Kenya," Dr. Loehrer said. "It will serve a population of 18 million to 20 million." The Chandaria Centre is named after a Kenyan businessman and philanthropist who helped fund the building. Significant funding also came from the Ruth Lilly Philanthropic Foundation, Pfizer and the IU Simon Cancer Center.

In addition to cancer treatment, the first floor will have space dedicated to caring for people afflicted by cardiovascular and pulmonary diseases, diabetes and mental illness. There will also be floors for research and education-key components of AMPATH's goal of building a sustainable cancer and chronic disease treatment program. "The model for AMPATH is to lead with care." Dr. Loehrer said. "Creating care models and supporting them with education and research creates a sustainable

model, and when we leave, we are leaving with Kenyans who will be well trained in these areas."

Several other IU personnel played key roles in moving the Chandaria Centre from dream to reality: Fredrick Chite Asirwa, MD, a Kenyan doctor who completed his residency and oncology fellowship at the IU School of Medicine, is the current co-director of AMPATH's oncology program; R. Matthew Strother, MD, who also completed his residency and fellowship at IU, is a former AMPATH team leader who helped establish the oncology program in Eldoret; and Robert Einterz, MD, director of the AMPATH Consortium and the IU Center for Global Health. Dr. Einterz is one of the four co-founders of AMPATH.

Dr. Einterz said the Chandaria Centre is not only a beacon of hope for Kenyans, but also for people closer to home. "It awakens the power of institutional partnerships to help the populations we purport to serve, particularly those who are left out," he said. The Chandaria Centre will also be an enduring physical manifestation of AMPATH's mission. That means putting the focus on treating people, first and foremost, Dr. Loehrer said. "When you go to Kenya, it's a stark reminder of why we became physicians-and that's to help other people. Your soul gets rejuvenated. You get reminded about why you're a doctor," Dr. Loehrer said.

Cancer center members' names appear in bold.



AMPATH CONSORTIUM MEMBERS

AMPATH is a partnership between Moi University School of Medicine, Moi Teaching and Referral Hospital in Eldoret, Kenya, and a health centers led by Indiana University. The others are: Brown University School of Medicine, Duke University Medical Center/ Hubert-Yeargen Center for Global Health, Lehigh Valley Hospital, University of Notre Dame/Eck Institute for Global Health. Providence Portland Medical Center, Purdue University, University of Massachusetts Medical School, University of Utah School of Medicine, University of Toronto Faculty of Medicine, and the University of California, San Francisco.

Competitive, coveted SPORE at IU is the first for pediatric cancers

A childhood cancer expert will lead the Indiana University School of Medicine's new five-year, \$12 million national research project to develop new treatments for diseases of a genetic mutation that leads to disfiguring and life-threatening tumors and other developmental disorders, mainly in children.

IU scientists lead \$12 million national initiative for new treatments for inherited cancers

By Eric Schoch

The SPORE team (I to r): Jamie Renbarger, MD; Kent Robertson, MD, PhD; Dr. Clapp; Lang Li, PhD; and Tatiana Foroud, PhD

The grant, one of the highly competitive and coveted projects funded by the National Cancer Institute's Specialized Programs of Research Excellence initiative, is the first such SPORE grant to focus on pediatric cancers. "This grant enables us to engage in research from the basic science lab to clinical trials to discover new treatments for a broad range of devastating cancers and related disorders, drawing on a team of some of the finest researchers in this field across the country," said **D. Wade Clapp, MD,** chairman of the Department of Pediatrics at the IU School of Medicine and researcher at both the IU Simon Cancer Center and the Herman B Wells Center for Pediatric Research.

Dr. Clapp, who serves as the principal investigator for the new project, said the funding will enable researchers to determine the complete genetic sequence of the research participants, providing unique opportunities to design precise treatments for patients, to adopt new research techniques and better understand how tumors develop resistance to drugs.

The disease at the heart of the project is neurofibromatosis type 1, which affects 1 in 3,000 children and is the most common inherited syndrome causing a predisposition to cancer. Neurofibromatosis is more prevalent than cystic fibrosis, Duchenne muscular dystrophy and Huntington's disease combined, according to the Children's Tumor Foundation. The mutation in the NF1 gene leads to a variety of symptoms, from mild to severe. Patients can develop café au lait spots and disfiguring tumors on or just under the skin. Internally, tumors can develop along nerve tissue and cause problems if they begin to press against vital organs or the windpipe. Some patients suffer from chronic pain.

In addition, recent research has found NF1 mutations in a variety of other types of cancers. NF1 mutations also affect an important molecular signaling protein called Ras, which, Dr. Clapp noted, is involved with more than a third of all cancers. In the process of developing better treatments for those with NF1 disorders, the research should also point the way toward new therapies for many other cancers, he said.

Dr. Clapp and colleagues at IU have been leaders in neurofibromatosis research, having first reported in 2008 that the drug Gleevec appeared to be the first effective treatment for neurofibromatosis type 1 tumors. Subsequent research substantiated that finding, but also determined that in some patients' genetic factors and tumor resistance hampered Gleevec's effectiveness.

The National Cancer Institute's Specialized Programs of Research Excellence, generally known as SPORE, are highly competitive grants awarded to projects that assemble research activities ranging from a better understanding of basic human biology all the way to clinical trials that lead to new treatments.

In addition to researchers from IU, the neurofibromatosis SPORE group—with the acronym DHART SPORE—will include collaborators from the University of California at San Francisco, the National Cancer Institute, the University of Texas Southwestern, Johns Hopkins University, the University of Alabama-Birmingham and the University of North Carolina.



Million Grant



New, developing genitourinary research program targets prostate cancer

A

By Matthew Harris a Michael Schug nationally recognized expert in prostate, renal and bladder cancers, Roberto Pili, MD, built a respected genitourinary program at Roswell Park Cancer Institute in Buffalo, N.Y., and now he's setting out to do the same at the IU Simon Cancer Center.

Just months into his job at IU, one of his first actions was reaching out to Timothy Ratliff, PhD, director of the Purdue University Center for Cancer Research, to collaborate on breakthroughs in the lab, develop new drugs, and build a large-scale clinical trial program.

For years, cancer researchers at the two Big Ten schools have collaborated, demonstrating team science before that was even a buzz word. IU has the expertise in testing potential new drugs in patients and a strong research program to find how these cancers take advantage of cellular pathways, while Purdue excels at engineering ways to target those pathways.

Dr. Pili knew of the collaborative spirit between the two campuses before he joined IU, and he seeks to strengthen it by building a genitourinary research program. "The Purdue University Center for Cancer Research and the IU Simon Cancer Center already have an established collaboration. The goal of building a joint genitourinary cancers program is a unique opportunity to consolidate this collaborative effort and to increase awareness of this common project," Dr. Pili said.







He added: "The new target identification and drug discovery platform at Purdue can synergize with the state-of-the art clinical trial infrastructure at IU. This partnership in the genitourinary program will be an example of how two cancer centers can successfully integrate and complement their expertise with the goal of advancing patient care."

Why the focus on genitourinary cancers?

Because of their prevalence, according to Dr. Pili. And prostate cancer is a particular focus since it is one of the most common cancers for men. Prostate cancer is a complex disease, from how it takes root to how it spreads and to what helps tumors take up residence in healthy tissue around the body.



It's also a focus because of the expertise found at IU. Under **Michael Koch, MD,** chair of the Department of Urology, and his predecessor, the late John Donohue, MD, IU has remained a clinical leader in treating prostate cancer for the past 50 years. And IU surgeons have developed ways to rid men of the disease while sparing them such side effects as impotence and incontinence.

"We have great expertise in basic science research to translate back to the clinic to help us come up with new therapies for prostate cancer," Dr. Pili said. Dr. Pili is confident the next frontier in stopping cancer is to help the body's immune system fight it. His expertise is developing drugs which do that job and conducting trials that are promising for prostate cancer. He is helping to develop drugs that block the response of cells keeping the body's defense system from attacking the disease. These drugs are being tested in clinical trials targeting prostate cancer and other genitourinary cancers.

To learn more

Visit www.cancer.iu.edu/gu to learn more about this developing research program.

Research programs

BREAST CANCER (BC) RESEARCH PROGRAM

The Breast Cancer research program is a highly interactive program which combines basic, translational and clinical research skills with the scientific goals of understanding the biology underlying breast cancer, and applying that understanding to improve prevention, diagnosis and treatment.



KATHY MILLER, MD

Professor of Medicine Ballve Lantero Scholar in Oncology IU School of Medicine



HARIKRISHNA NAKSHATRI, BVSC, PhD

Marian J. Morrison Professor in Breast Cancer Research Professor of Surgery Professor of Biochemistry and Molecular Biology IU School of Medicine

MEMBERS

Sunil Badve, MBBS, MD Crislyn D'Souza-Schorey, PhD Bennett Elzey, PhD Linda Han MD Chunyan He, ScD Brittney-Shea Herbert, PhD Mircea Ivan, MD, PhD Philip Johnson, PhD Lang Li, PhD Laurie Littlepage, PhD Yunlong Liu, PhD Natascia Marino, PhD Samy Meroueh, PhD Lida Mina, MD Kenneth Nephew, PhD

Jenifer Prosperi, PhD Sara Quinney, PharmD, PhD Milan Radovich, PhD Zachary Schafer, PhD Bryan Schneider, MD Todd Skaar, PhD Keith Stantz, PhD Anna Storniolo, MD Hiromi Tanaka, PhD Claire Walczak, PhD Clark Wells, PhD Hiroki Yokota, PhD Richard Zellars, MD Jian-Ting Zhang, PhD Siyuan Zhang, MD, PhD

Bold denotes members accepted in 2015

EXPERIMENTAL AND DEVELOPMENTAL THERAPEUTICS (EDT) RESEARCH PROGRAM

The Experimental and Developmental Therapeutics program is a multidisciplinary program that promotes and facilitates the development of new cancer therapies from bench to bedside. The scientific goal of the EDT Program is to discover and develop novel cancer therapeutics, fitting well with the overall mission of the IU Simon Cancer Center.

DANIELA MATEI, MD



Professor of Medicine Professor of Obstetrics and Gynecology IU School of Medicine



ZHONG-YIN ZHANG, PhD Chair, Department of Biochemistry and Molecular Biology Robert A. Harris Professor IU School of Medicine

CANCER PREVENTION AND CONTROL (CPC) RESEARCH PROGRAM

Cancer Prevention and Control researchers are engaged in innovative and collaborative research with the potential to decrease cancer morbidity and mortality. CPC researchers are also involved in prevention and early detection of debilitating symptoms caused by cancer treatment while tailoring cancer treatment to individuals. The program's themes focus on three crucial challenges across the cancer continuum: preventing the occurrence of cancer; increasing effectiveness and adherence to cancer screening; and identifying mechanisms of treatment-related neurotoxicities (neuropathy and cognitive dysfunction) while reducing symptom burden from cancer therapies.



DAVID HAGGSTROM, MD

Associate Professor of Medicine, IU School of Medicine Research Scientist, Regenstrief Institute Founding Director, IUPUI Center for Cancer Population Analytics and Patient-Centered Informatics



JIALI HAN, PHD

Rachel Cecile Efroymson Professor in Cancer Research IU School of Medicine Professor and Chair of Epidemiology Richard M. Fairbanks School of Public Health at IUPUI

MEMBERS

Asok Antony, MD Darron Brown, MD Debra Burns, PhD Janet Carpenter, PhD, RN Lisa Carter-Harris, PhD Clint Cary, MD, MPH Victoria Champion, PhD, RN Jill Fehrenbacher, PhD Betsy Fife, PhD J. Fortenberry, MD Joan Haase, PhD, RN Katharine Head, PhD Susan Hickman, PhD Sula Hood, PhD Karen Hudmon. DrPH Thomas Imperiale, MD Pascal Jean-Pierre, PhD Shelley Johns, PsyD Charles Kahi, MD Kurt Kroenke, MD Chiung-ju Liu, PhD Juhua Luo, PhD Jonathan Macy, PhD, MPH Brenna McDonald, PsvD Beth Meverson, PhD Patrick Monahan, PhD

Catherine Mosher, PhD Hongmei Nan, MD, PhD Julie Otte, PhD, RN Kevin Rand, PhD Susan Rawl, PhD Jamie Renbarger, MD Douglas Rex, MD Sheri Robb, PhD Rajesh Sardar, PhD Andrew Saykin, PsyD Peter Schwartz, MD, PhD Amikar Sehdev, MD, MPH Marcia Shew, MD Jodi Skiles, MD, MS Yiqing Song, MD, ScD Nathan Stupiansky, PhD Zhiyong Tan, PhD Lois Travis, MD, ScD Michael Vasko, PhD Terry Vik, MD Diane Von Ah. PhD. RN Bree Weaver, MD Fletcher White, MS, PhD Kara Wools-Kaloustian, MD Jianjun Zhang, MD, PhD Gregory Zimet, PhD

Bold denotes members accepted in 2015

HALE, BROXMEYER, PhD



Distinguished Professor Mary Margaret Walther Professor Emeritus Professor of Microbiology/Immunology IU School of Medicine

G. DAVID ROODMAN, MD, PhD



Director, Division of Hematology/Oncology Kenneth Wiseman Professor of Medicine Professor of Biochemistry & Molecular Biology IU School of Medicine

MEMBERS

Costantine Albany, MD Lata Balakrishnan, PhD Timothy Corson, PhD Joseph Dynlacht, PhD Lawrence Einhorn, MD Michael Ferguson, MD Thomas Gardner, MD Millie Georgiadis, PhD Nasser Hanna, MD Thomas Hurley, PhD Shadia Jalal, MD Steven Johnson, PhD Chinghai Kao, PhD Mark Kelley, PhD Michael Koch, MD Janaiah Kota, PhD Suk-Hee Lee, PhD Hyun-Suk Lim, PhD Patrick Loehrer, MD

Tao Lu, PhD Timothy Masterson, MD Lindsey Mayo, PhD Marc Mendonca, PhD Samy Meroueh, PhD Amber Mosley, PhD Grzegorz Nalepa, MD, PhD Bert O'Neil, MD Roberto Pili, MD Jamie Renbarger, MD Ahmad Safa, PhD Safi Shahda, MD Chie-Schin Shih, MD John Turchi, PhD Jingwu Xie, PhD Xiao-Ming Yin, MD, PhD Jian-Ting Zhang, PhD Adam Zlotnick, PhD

Bold denotes members accepted in 2015

HEMATOPOIESIS, HEMATOLOGIC MALIGNANCIES, AND IMMUNOLOGY (HMI) RESEARCH PROGRAM

The central themes of the Hematopoiesis, Hematologic Malignancies, and Immunology (HMI) program are: (1) Hematopoiesis; (2) Hematologic Malignancies; (3) Immunology. The ultimate programmatic goal of the program is to use results from member studies to develop novel therapeutic approaches for treating patients with malignancies. These comprehensive studies include basic and disordered hematopoiesis, the pathophysiology of hematologic malignancies and immune cell function associated with hematopoiesis, hematopoietic cell transplantation and tumors.

MEMBERS

Rafat Abonour, MD Jose Azar, MD Sandeep Batra, MD Janice Blum, PhD H. Scott Boswell, MD Randy Brutkiewicz, PhD Brian Calvi, PhD Nadia Carlesso, MD, PhD Rebecca Chan, MD, PhD Hua-Chen Chang, PhD John Chirgwin, PhD D. Wade Clapp, MD Larry Cripe, MD James Croop, MD, PhD Magdalena Czader, MD, PhD David Delgado, MD Alexander Dent, PhD Sherif Farag, MBBS, PhD W. Scott Goebel, MD, PhD Laura Haneline, MD Jay Hess, MD, PhD

Mark Kaplan, PhD Reuben Kapur, PhD Heiko Konig, MD, PhD Noriyoshi Kurihara, DDS, PhD Jianyun Liu, PhD Yan Liu, PhD Keith March, MD, PhD Christie Orschell, PhD Sophie Paczesny, MD, PhD Louis Pelus, PhD Michael Robertson, MD Carlos Serenzani, PhD Rebecca Silbermann, MD David Skalnik, PhD Edward Srour, PhD Jie Sun. PhD Attaya Suvannasankha, MD Mervin Yoder, MD Momoko Yoshimoto, MD, PhD Baohua Zhou, PhD

Bold denotes members accepted in 2015

Research programs

TUMOR MICROENVIRONMENT AND METASTASIS (TMM) RESEARCH PROGRAM

The Tumor Microenvironment and Metastasis program arose as a consequence of existing collaborations established in a working group among interactive investigators studying solid tumors and metastatic processes. The scientific goals of the TMM program are to advance our basic understanding of the role of cancer cell stromal interactions in cancer initiation, progression and metastasis; to evaluate the functions of the metastatic niche; and to translate discoveries of the pathobiology of solid tumors, the tumor microenvironment and the metastatic niche into new cancer targets and novel therapies.



THERESA GUISE, MD

Jerry and Peggy Throgmartin Professor of Oncology Professor of Medicine IU School of Medicine

MURRAY KORC, MD Myles Brand Professor of Cancer Research



Professor of Medicine Professor of Biochemistry and Molecular Biology *IU School of Medicine* Director *Center for Pancreatic Cancer Research*

MEMBERS

Elliot Androphy, MD Andrea Bonetto, PhD D. Wade Clapp, MD Karen Cowden Dahl, PhD Hong Du, PhD Melissa Fishel, PhD James Fletcher, MD John Foley, PhD Jesse Gore, PhD Shannon Hawkins, MD, PhD Reginald Hill, PhD Peter Hollenhorst, PhD Heather Hundley, PhD David Ingram, MD Travis Jerde, PhD Melissa Kacena, PhD Chien-Chi Lin, PhD Anirban Mitra, PhD Khalid Mohammad, MD, PhD Samisubbu Naidu, PhD

Kenneth Nephew, PhD Heather O'Hagan, PhD Beth Pflug, PhD Karen Pollok, PhD Lawrence Quilliam, PhD Kent Robertson, MD, PhD Ravi Sahu, PhD Uma Sankar, PhD Dan Spandau, PhD M. Sharon Stack, PhD William Thompson, DPT, PhD David Waning, PhD Ronald Wek, PhD Kenneth White, PhD Jingwu Xie, PhD Yan Xu, PhD Cong Yan, PhD Toshiyuki Yoneda, DDS, PhD Teresa Zimmers, PhD

Bold denotes members accepted in 2015



Lawrence Einhorn, MD, (left) and Nasser Hanna, MD, earn recognition during an Indiana Pacers home game in early 2015 for their contributions to testicular cancer. The Pacers' Indiana Heroes Award program honors individuals who have made an overwhelming impact on the lives of others, and who, through their commitment and humanitarian spirit, have made exceptional and lasting contributions to the community and state.

Frank McGrath photo

91 Current number of NCI- funded projects

Total external cancer research funding



<mark>66.5</mark>%

The IU Simon Cancer Center annual giving through philanthropy averages



to support its research mission.

Photography: Tim Yates, Office of Visual Media/IU School of Medicine (1 – 3); Tyagan Miller (4 – 5); and Neil Flick (6).





Shared facilities

• ANGIO BIOCORE

Angelo Cardoso, MD, PhD Director 317.274.4385 **Emily Sims** Manager 317.278.7232

www.cancer.iu.edu/angiobiocore

A state-of-the-art facility that provides validated and highly-reproducible in vitro and in vivo assays to study angiogenesis, endothelial and hematopoietic cell biology, and their role in normal and pathological conditions, including cancer, diabetes, cardiovascular and infectious diseases. Services provided include functional studies, metabolism assays, multi-parametric flow cytometry assays and screenings for anti-angiogenic compounds.

BEHAVIORAL AND CANCER CONTROL RECRUITMENT CORE

Stephanie Wofford, MSM 317.278.0608 www.cancer.iu.edu/behavioral

The mission of the Behavioral and Cancer Control Recruitment Core is to serve the needs of all cancer center investigators whose research has a behavioral or Cancer Prevention and Control focus and involves human subjects. The core was established to optimize behavioral and cancer control research recruitment. Its purpose is to coordinate, support accrual and supervise recruitment of all approved behavioral and cancer control studies. The core provides supervised recruitment throughout the IUSCC, other sites and regional social networks. In addition, it provides recruiter training, communication with clinical care groups, recruitment material preparation and ongoing recruitment strategy assessment.

BIOSTATISTICS & DATA MANAGEMENT

Susan Perkins, PhD Director 317.274.2626 www.cancer.iu.edu/biostats

The Biostatistics and Data Management Core has statistical, data management, administrative and educational responsibilities. The core participates in every level of research, from study planning and monitoring to data analysis and dissemination of results.







CHEMICAL GENOMICS

Zhong-Yin Zhang, PhD Director 317.274.8025

www.cancer.iu.edu/chemgen

The mission of the Chemical Genomic Core is to provide IU investigators with cost-effective access to high throughput screening of structurally-diverse, drug-like small molecules in biological assays provided by the investigators. This enables investigators to discover small molecule tools for basic research, therapeutic development and diagnostic applications. The core incorporates instrumentation, compound libraries, computer database and a staff experienced in assay development, high throughput screening and laboratory robotics. It is a service and collaborative research resource where facility staff works closely with each investigator through all stages of the screening process, providing an opportunity for IU students and fellows to gain experience and training in high throughput screening at the facility.

CLINICAL PHARMACOLOGY ANALYTICAL CORE

David Jones, PhD Director

317.630.8726

www.cancer.iu.edu/cpac

The Clinical Pharmacology Analytical Core provides services to IU Simon Cancer Center members as well as the Indiana University School of Medicine faculty to assist in the:

- and on dried blood spot cards
- pharmacokinetic analysis of data (noncompartmental only)
- measurement of metabolic stability and metabolite identification of new chemical entities
- measurement of protein binding of drugs and new chemical entities

• CLINICAL TRIALS OFFICE

Kerry Bridges, MBA, RN, CCRC Administrator, Adult CTO 317.274.2552

Linda Battiato, MSN, RN, OCN Associate administrator, CTO 317.278.4971

www.cancer.iu.edu/cto

The Clinical Trials Office provides comprehensive clinical trials services to IU Simon Cancer Center members. Services include protocol review and monitoring, protocol development, data safety monitoring and data management as well as training and supervision of staff and maintenance of research databases.

Shadia Jalal, MD

• quantification of drugs and new chemical entities in tissues (including blood, plasma, serum and solid tissues)

• qualitative and quantitative assessment of formulations for use with new chemical entities in preclinical studies

James Croop, MD, PhD Director, Pediatric CTO Medical director, Adult CTO Melissa Lee, BS, CCRA Clinical Research Manager, Pediatric CTO

Shared facilities

COLLABORATIVE CORE FOR CANCER BIOINFORMATICS

Lijun Cheng, PhD
Core manager
IU Simon Cancer Center
844.740.0040

Nadia Atallah, PhD Core manager Purdue University Center for Cancer Research

www.cancer.iu.edu/bioinformatics

The Collaborative Core for Cancer Bioinformatics is a shared facility between IU Simon Cancer Center and Purdue University Center for Cancer Research. The core's goal is to integrate and accelerate cancer discovery, drug discovery, precision medicine and training through a joint bioinformatics/molecular genetics/genomics initiative that will enhance research capability and form the foundation for more rapid data generation, manuscript publication and joint multi-investigator grant applications.

• EPIDEMIOLOGY CONSULTATION CORE

Hongmei Nan, MD, PhD Director 317.278.3907 www.cancer.iu.edu/epi

The overall goal of population research is the prevention and early diagnosis of human diseases, proper treatment fitting the patients, as well as improved survival rates. The Epidemiology Consultation Core aims to promote population research and education in epidemiology at the IU Simon Cancer Center by facilitating collaborative interactions between faculty members from the cancer center and the multiple academic institutions in Indiana, thus, promoting joint research projects and grant proposals related to population research.

FLOW CYTOMETRY RESOURCE FACILITY

Edward Srour, PhD Director 317.274.3589 www.cancer.iu.edu/flow

The Flow Cytometry Resource Facility (FCRF) provides flow cytometric analysis and cell sorting services, including consultation, technical advice and collaboration, thus, promoting the application of cutting-edge flow cytometric protocols to varied scientific needs of cancer center scientists. In addition, the FCRF provides state-of-the-art time of flight analysis using the new CyTOF2 technology as well as single cell genomics, including RT-PCR, DNA sequencing, and RNA-seq based on the Fluidigm platform.

• IN VIVO THERAPEUTICS CORE

Karen Pollok, PhD Director 317.274.8891 www.cancer.iu.edu/ivt

The mission of the In Vivo Therapeutics (IVT) Core is to provide IUSCC investigators with cost-effective and comprehensive services to facilitate the development and testing of novel pharmacological and cellular therapies.

MULTIPLEX ANALYSIS CORE

Christie Orschell, PhD Director 317.278.2485 www.cancer.iu.edu/mac

The Multiplex Analysis Core offers microplate-based bioassay systems that can perform multiplex analysis of multiple different analytes in a single sample. Multiplex systems are faster, more efficient and use less sample volume than other technologies such as ELISA and Western Blot. The core provides technical expertise and consultation for high-quality protein quantitation (pictogram/femtogram level), using commercially available kits or custom kits designed by the PI. Multiplex kits for phosphor-proteins and nucleic acids are also available.

THERAPEUTIC VALIDATION

Nagendra K. Prasad, BVSc, PhD, MBA Director 317.278.6608 www.cancer.iu.edu/therapeutic

The Therapeutic Validation Core (TVC) assists clinical investigators in the development and execution of correlative biological assays needed to validate mechanism(s) of action of candidate drugs/therapies and to develop and test new hypotheses. It also provides technical and intellectual support in the development, implementation and validation of predictive and pharmacodynamic biomarkers for novel, molecularly-targeted anti-cancer agents.

• TISSUE PROCUREMENT AND DISTRIBUTION

Mary Cox
Operations Manager
Oscar Cummings, MD
Director
317.274.4320

www.cancer.iu.edu/tissue

Tissue Procurement and Distribution provides samples for the discovery of new drug targets and biomarkers, the development of cancer cell lines and patient derived xenografts (PDX) and DNA and RNA research. It serves as a resource for the centralized banking of tissue, blood, bone marrow and buccal swab specimens procured from patients.

TRANSGENIC AND KNOCK-OUT MOUSE

Loren Field, PhD Director 317.630.7776 www.cancer.iu.edu/mouse

The Transgenic & Knock-Out Mouse Core provides services for the production of traditional transgenic mice and CRISPR-mediated knockout mice via pronuclear injection. The core also provides services for ES cell line injection into blastocyst, embryo and sperm cryopreservation and recovery.

George Sandusky, DVM, PhD Associate Director Attaya Suvannasankha, MD

Associate Director of Clinical Research

U INDIANA UNIVERSITY

MELVIN AND BREN SIMON CANCER CENTER

535 Barnhill Drive | Indianapolis, IN 46202 | cancer.iu.edu