Breakthroughs

Feinberg School of Medicine Research Office

September 2014

Northwestern's newly revitalized Department of Pharmacology combines classical pharmacology with genmoics, drug discovery, and translational medicine.

Pharmacology Leverages Genomics to Fuel Drug Discovery at Feinberg

Imagine a system that analyzes interactions between all the drugs a patient is taking – four, five, 10, or even more – in tandem with the patient's genomic variants.

This vision can be a reality, thanks to scaling and collaboration plans spearheaded by Alfred L. George Jr., MD, chair of the newly revitalized Department of Pharmacology.

"Our plan is to create an industrial-scale approach to evaluate the impact of all the genetic variation in an individual that can affect drug metabolism for all drugs to which he or she may be exposed," said George, whose research trajectory during the last 25 years has been a combination of pharmacology and genetics.

George's expertise lies in ion channels, membrane proteins all cells have that allow ions—sodium, potassium, chloride, calcium, and many others—in and out of cells. He studies channelopathies, diseases caused by mutations in the genes that code for ion channel proteins, particularly in disorders that affect the brain and the heart such as epilepsy and cardiac arrhythmia.

In 1995, George and colleagues at Vanderbilt University explained the consequences of a cardiac sodium channel mutation discovered in an inherited form of long-QT syndrome (LQTS). LQTS is an abnormal heart rhythm that can cause sudden death in children and young adults. The discovery led to an innovative goal: pharmacologically suppressing ion channel abnormalities.

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Northwestern Medicine®

Pharmacology Leverages Genomics to Fuel Drug Discovery

(continued from cover page)

"That's what we've been doing for a long time: studying a gene, finding mutations, doing functional studies of those mutations, and then trying to figure out pharmacological strategies to fix the functional defect," said George.

He joined Northwestern University Feinberg School of Medicine this past March to head the new Department of Pharmacology, which was born from the former Department of Molecular Pharmacology and Biological Chemistry.

"Dean Neilson's vision was to invest in the basic sciences, to bring in leaders, and give them the resources to recruit several new faculty," said George, whose aims for the department include prioritizing drug discovery and building a high-throughput facility for drug screening tailored to ion channel targets.

During the next few years, he plans to recruit additional faculty members who specialize in neuropharmacology, cardiovascular pharmacology, and cancer pharmacology.

"We're going to build a department that's greater than the sum of its parts, with an emphasis on translation," said George.

Several initiatives are in the works to make that happen: in July, George's lab received a four-year, $5 million grant from the National Institutes of Health (NIH) to develop a model for studying the structure and function of genetic variations on a large scale to help inform medical decisions.

"Physicians find new mutations every day but they don't know how to interpret them, nor do genetic testing labs," said George.

Using a next-generation high-throughput automated electrophysiology instrument – the first of its kind in the United States and at an academic institution – George's lab will be able to examine hundreds of mutations at a time. The NIH study will focus on LQTS, but George hopes to apply the model to many ion channels and related targets.

George is also director of the new Center for Pharmacogenomics at Feinberg, part of a field that investigates differences in how people respond to drugs. He has already started sharing ideas with an NIH-funded pharmacogenomics program here called the Electronic Medical Records and Genomics (eMERGE) Network.

Alfred L. George, Jr., MD, chair of the Department of Pharmacology and director of the new Center for Pharmacogenics.

Scientists know a lot about drug interactions. When taken together, certain drugs compete for their therapeutic target, sometimes in ways that make one of them toxic. Physicians know to watch out for particular drug-gene pairs, too.

"Most patients aren't on just one drug, and they may have variation in more than one gene," said George. "We need to consider the combination, what we are calling 'drug-gene-drug' interactions. This will involve a basic science approach combined with clinical research."

One of the new Center's driving forces is translating pharmacogenomic testing and interpretation into practice.

"Northwestern may be uniquely positioned, because we have a great hospital with an advanced electronic health record system and an academic pharmacy department," said George. He would like to collaborate with Northwestern Memorial Hospital's residency program in pharmacy to get more professionals involved. "Implementation and collaboration are part of the vision for the Center for Pharmacogenomics."

George's lab is also currently working with Milan Mrksich, PhD, Henry Wade Rogers Professor of Biomedical Engineering, Chemistry, and Cell and Molecular Biology.

"Mrksich has developed a high-throughput system called SAMDI for measuring and monitoring the products of enzymatic and chemical reactions," said George. "We are working with him to adopt this system to perform very large-scale drug metabolism measurements looking at genetic variation in enzymes against a large panel of drugs."

The objective of all these plans is to create a massive database of genetic variants and how they impact metabolism of multiple drugs, alone and in combinations.

"Using this approach, we may uncover previously unrecognized drug interactions that arise in genetically impaired drug metabolism," said George. "Previously, drug-drug interaction data has been based on the assumption of a normal genome, but most patients don't have a normal genome."

CONTENTS

Feinberg Welcomes New PhD Students

This fall, new Doctor of Philosophy (PhD) students arrived on the Chicago campus to join the Driskill Graduate Program in Life Sciences (DGP), Northwestern University Interdepartmental Neuroscience Program (NUIN), Medical Scientist Training Program (MSTP), Clinical Psychiatry PhD program, Doctor of Physical Therapy-PhD (Eng) program, and Health Sciences Integrated PhD (HSIP) Program.

DGP welcomed 18 new PhD students. This group includes individuals with undergraduate degrees from schools as close as the Midwest, and as far as Russia, Korea, and China. These students will complete courses and lab rotations during the first year, which allow them to explore several types of research before selecting a dissertation lab and project.

The new NUIN students hail from Brazil, Taiwan, Korea, and across the United States. The entering class comprises 20 PhD candidates. They will complete coursework and research rotations in at least three different laboratories before committing to a single lab to conduct thesis research.

The MSTP welcomed 13 new students who will earn both their Doctor of Medicine (MD) degree and PhD degree at Northwestern. They will complete two years of medical school before starting their doctoral program in a lab. Once they earn their PhD, they will return to medical school to complete their MD degree. This year's entering class earned undergraduate degrees from institutions that include Princeton University, Stanford University, Johns Hopkins University, and Massachusetts Institute of Technology.

Nine new students have begun the Clinical Psychology PhD program. They will spend six years at Feinberg for training in the clinical practice and science of psychology, along with specific training needed for careers as clinical psychologists conducting research and/or clinical work in academic medical centers or other health care settings. Students in this year's class come from as far as Tokyo and India to Michigan, and California.

Driskill Graduate Program in Life Sciences PhD students attended orientation in early September on Northwestern University's Chicago campus.

The Doctor of Physical Therapy-PhD (Eng) program welcomed one new student who will earn both his Doctor of Physical Therapy (DPT) degree and PhD in biomedical engineering at Northwestern. He will complete two years of engineering school before starting the DPT program at Feinberg, then will finish his PhD degree in engineering in Evanston. This year's entering student graduated from Case Western Reserve University.

Finally, four new students joined the HSIP program to become its third entering class. Founded in 2012 and unique to Northwestern, HSIP trains students in processes and methodologies in clinical and population sciences through the Institute for Public Health and Medicine. The class of 2013 comes from Chicago, Wisconsin, Massachusetts, and Nigeria, and all have previously earned master's degrees.

NUCATS Corner: Boost Your Chances for Federal Funding

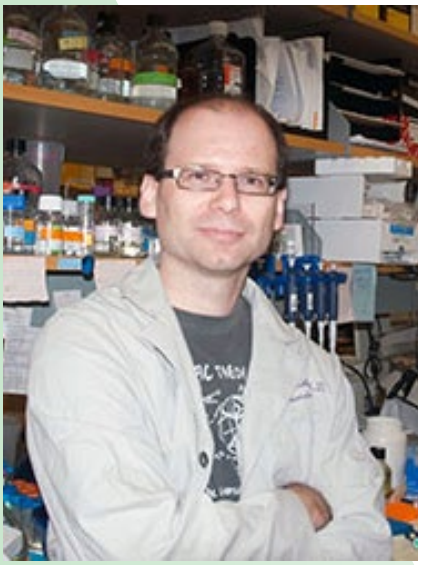
NUCATS launched a new online learning module that teaches how to link their research results to grants through the NIH's My NCBI. Linking grants to publications in My NCBI allows researchers to tie publication results directly to the grants that supported them. Acknowledging grants in manuscript text or having a PubMed Center (PMC) ID number does not link the manuscript to the grant. Investigators must do this through My NCBI. As of February 2014, NIH has delayed processing on all non-competing continuation grant awards not in compliance with the NIH public access policy, which includes both obtaining PMC ID numbers and tracking manuscripts in My NCBI. Learn how to link your research results.

NUCATS provides essential infrastructure, resources and services to support the translational research enterprise through the NIH Clinical and Translational Science Award (CTSA). In preparation for CTSA submission, NUCATS is asking all Northwestern investigators for help to ensure that publications resulting from CTSA resources are appropriately linked. Publications are the key metric that congress, the NIH and the university use to demonstrate effective use of grant funding. Investigators that leverage the CTSA and link it to their publications demonstrate effective use of federal resources and are more competitive for federal awards.

Northwestern researchers are strongly encouraged to use this new resource to help connect their research results to all of their grant resources, including the CTSA. Please help NUCATS and link your publications today!

Faculty Profile: Christian Stehlik, PhD

John P. Gallagher Research Professor of Rheumatology



Christian Stehlik, PhD, John P. Gallagher Research Professor of Rheumatology, and his team recently discovered a new gene and defined its role in the body's inflammatory response against infection.

His study, published in *Nature Immunology*, found the protein POP3, interferes with the function of special sensors that detect viruses and trigger defensive inflammatory responses.

These findings may provide new therapeutic targets against inflammatory responses produced from viruses like HIV or in autoimmune diseases.

Q&A

What are your research interests?

My research interest is innate immunity, and our research centers on the host response during inflammatory and autoimmune disease. In particular, our research focuses on the function of cytosolic pattern recognition receptors in macrophages. We work to unravel the molecular mechanism by which these receptors promote inflammation. A main emphasis is on the mechanisms that negatively regulate and mediate the resolution of these responses, as this understanding may allow us to inhibit excessive activity linked to disease. We use biochemical and cell biological approaches to investigate human and mouse cells and utilize mouse genetics and mouse disease models for these studies. Some of the disease models we utilize to dissect these pathways include gout, rheumatoid arthritis, systemic lupus erythematosus, Cryopyrinopathies, and sepsis.

What is the ultimate goal of your research?

Our goal is to define the molecular mechanism by which cytosolic pattern recognition receptors are activated, their downstream signaling properties, and their regulation. Hereditary mutations and other defects in these pathways cause excessive and uncontrolled production of downstream effectors, such as pro-inflammatory cytokines and type I interferons, which contribute to, but can also directly cause inflammatory and autoimmune diseases. Besides defining the function of these pathways, we attempt to modulate pathway activity, such as delivery of antagonists and inhibitors into macrophages, to blunt excessive pathway activity and investigate the impact on disease severity in mice. Ultimately, these studies may open novel avenues for developing improved therapies to dampen these responses to benefit patients.

What types of collaborations are you engaged in across campus?

The environment at Feinberg enables us to benefit from several collaborations, in particular with labs in the Department of Medicine on inflammatory and autoimmune disease. Studies with Harris Perlman, PhD, and Richard Pope, MD, already have resulted in several publications and National Institutes of Health grants. We also collaborate with faculty from the Department of Microbiology-Immunology on microbial and viral activation of the signaling pathways we study, including Eva Gottwein, PhD, Alan Hauser, MD, PhD, Karla Fullner-Satchell, PhD, and Nicholas Cianciotto, PhD. We also collaborate with several labs outside Northwestern on various disease models, including Yon Rojanasakul, PhD, at West Virginia University, Harold Hofmann, MD, at University of California-San Diego, Virginia Pascual, MD, at Baylor Health Care System, Divaker Choubey, PhD, at the University of Cincinnati, David Greaves, PhD, at the University of Oxford, and John Reed, MD, PhD, Roche Pharma Research and Early Development.

How is your research funded?

My laboratory is funded by two National Institutes of Health (NIH) R01 grants, an NIH postdoctoral training grant, a grant from the American Heart Association, and the John P. Gallagher Research Professorship.

Who inspires you?

My biggest inspiration comes from my dad, who is a biochemist and until his retirement, directed a research institute in Austria. When I was little, he sometimes took me with him to work. I was fascinated by the exciting things that I saw happening there and by all the fancy equipment present in a laboratory. These were lasting impressions and I knew from early on that I wanted to one day work in such a laboratory.

Student Profile: Anil Wadhwani

Medical Science Training Program

Anil Wadhwani, a fourth-year MD/PhD student in the Medical Science Training Program (MSTP), studies human stem cells to explore the mechanisms of genetic risk in Alzheimer's disease in the laboratory of John Kessler, PhD, professor of Neurology and Pharmacology.

Wadhwani received his undergraduate degree in biological sciences from the Integrated Science Program at Northwestern University. He knew early in his career that he wanted to dedicate his time to researching a scientific problem with clinical significance. The MD/PhD program at Northwestern University has allowed him to integrate scientific and clinical training into his research.

Q&A

What is your hometown?
I was born in Joliet, Illinois.

What are your research interests?
My overarching interest is in disorders of cognition. The human brain processes and stores complex information by mechanisms we are only beginning to understand, and intellect varies widely from individual to individual. Some possess superior memory or creative capacities, while these aspects may be limited in others, including those with diseases ranging from Autism to Alzheimer's. I'd like to use molecular and systems neuroscience to model human diseases to better understand their pathogenesis and elicit information about how the brain processes and stores information.

What exciting projects are you working on?
Currently, in the laboratory of John Kessler, PhD, I am using human stem cells to explore the mechanisms of genetic risk in Alzheimer's disease. Individuals with a specific mutation in Apolipoprotein E are at significantly increased risk of developing the disease, but the specific mechanism by which this protein contributes learning and memory deficits is not well known.

We are partnering with the clinical researchers at the Cognitive Neurology and Alzheimer's disease Center to obtain skin samples from patients with or without the disease. We will transform these cells into pluripotent stem cells, and grow them into neurons and astrocytes in order to generate a human cellular model of the disease. With this platform in place, we'll be able to make experimental manipulations to probe the mechanisms of pathogenesis or test prospective therapies.

Why did you choose Northwestern?
Northwestern's MSTP melds clinical and basic science training in the context of a supportive student and faculty community in a leading urban academic medical center. With the combination of a progressive medical education, strength in neuroscience research, and exposure to broad spectrum of diseases, I was confident that I would develop the skills necessary for a career as a physician-scientist.

What has been your best experience at Feinberg?
I will never forget one of the earliest days in the anatomy labs, where we performed a laminectomy on the vertebrae in order to reveal the spinal cord. Hidden deep in the body, behind muscle, sinew, and bone, this massive bundle of nerves gave rise to numerous branches, each reproducibly traceable to different parts of the body. I was simply amazed by the intricacy of the structure, and in awe of the series of complex events that enabled the structure to form and function.

How would you describe the faculty at Feinberg?
In one word: committed. The faculty members I have met at Northwestern are deeply invested in the practices of medicine, science, and education. From my research adviser who has built a collaborate and supportive laboratory, to my clinical educators who always put their patients first, each in his or her own way has made a remarkable commitment to improving the health of others. In addition, the staff at Northwestern deserve special attention as well. I am always greeted and often greatly assisted by the people at University who enable it to function, from the librarians, to the security staff, and everyone in between. Together, we make a great community.

What are your plans for after graduation?
After graduation, I plan to continue my clinical training in a field related to neuroscience or regenerative medicine, with the hopes of one day establishing my own translational research program. I am deeply invested in education, in part because of the instructors I have had in the past, and hope to teach in some capacity, be it in a lecture hall, laboratory, or on the wards.

What do you do in your free time?
Architecture and music are my two main interests outside of medicine, and I'm fortunate that Chicago has no shortage of either. The year is riddled with concerts and open houses, and I love to attend both when I have time.

Staff Profile: Pamela Carpentier

Assistant Director, Driskill Graduate Program in Life Sciences

Where are you originally from?
I am originally from Scotia, New York, a small town outside of Albany.

What is your educational background?
I got my undergraduate degree in neuroscience from Drew University in New Jersey, and my doctorate degree, also in neuroscience, here through the Northwestern University Interdepartmental Neuroscience (NUIN) program.

Please tell us about your professional background.
I did a postdoc at Stanford University with Theo Palmer, PhD, in the Institute for Stem Cell Biology and Regenerative Medicine. After that, I worked as an associate editor for *The Journal of Cell Biology* for two years before returning to Northwestern.

Why did you choose to work at Northwestern?
I really enjoyed my time here during graduate school. We were living in New York City when my second son was born. We had been talking about moving back to the Chicago area to be closer to family, so when I saw this job opportunity, it just seemed perfect.

What is your role within DGP?
I do a little bit of everything for our program, from recruiting and admissions through graduation. One thing I have been working on a lot recently is career development for our students. I've been focusing on exposing our students to careers outside of academia and opportunities for them to develop skills to help achieve their career goals, in academics or otherwise. I've been organizing panels of speakers to come talk to our students about their different career paths. In the coming year, I will also be setting up skill-building workshops and classes. I've also been working a lot on building our online presence.

DGP just completed a major redesign of our website. I also started a DGP Facebook page and manage a LinkedIn group for current and former students and postdocs across the biological sciences at Northwestern. My goal here is to build a community for DGP students that extends beyond their time at Northwestern. We have had a lot of success getting our alumni to come back to talk to students about their careers and how they found success. It's something I would like to build on in the future.

How do you help scientists and students at the medical school?
I'm always available to our students for whatever they need. I can act as a resource to answer many of their questions or direct them to someone who can. I can also help students with selecting courses and labs, finding extracurricular activities, or thinking about future careers. I'm happy to talk about their science, publishing papers, or writing grants. I can also just be a person to talk things through with if they are having a problem.

What is your favorite part of the job?
I really enjoy working with our students. They are a very smart and ambitious bunch, and I can't wait to see what they do next.

What do you like to do in your spare time?
I have two small boys at home (11 months old and four years old). I don't have any spare time! When I get some again, I enjoy traveling, hiking, cooking (and eating!), and playing the cello.

Career Development for Junior Faculty and Fellows

Postdoctoral fellows and junior faculty are invited to participate in "First Mondays: Navigating the Research Enterprise," a monthly series that provides an introduction to issues such as finding sources of research funds, writing effective grants, and building a network of professional colleagues. The workshops, hosted by Rick McGee, PhD, associate dean for faculty recruitment and professional development, and Bill Lowe, MD, vice dean for academic affairs, are free, but registration is encouraged.

Learn more and register online. Dates and times, course materials and speakers are listed on the NUCATS web site.

Research in the News

New York Times August 30
New Novartis drug effective in treating heart failure
Clyde Yancy was quoted.

The Washington Post August 28
Electrical current to brain improves memory performance, researchers find
Joel Voss' research was featured.

- Voss' research was also featured in *Time*, *Science*, *US News & World Report*, *Popular Mechanics*, and more.

WGN News August 19
Alternate breast cancer treatment more direct route to tumor cells
Seema Khan's research was featured.

Chicago Tribune August 16
Top cardiologist touts vegan diet to patients
Neil Stone was interviewed as an expert source.

CNN News August 14
Another reason to want the corner office: It's good for your health
Phyllis Zee's research was featured.

- Zee's research was also featured on MSN.com, AARP.com, in the *Philadelphia Inquirer*, and more.

The Washington Post August 14
Robin Williams' wife: He had Parkinson's disease
Tanya Simuni was quoted.

BBC News August 12
Music lessons can close reading gap
Nina Kraus' research was featured.

- Kraus' research was also featured on PBS Newshour and *US News & World Report*.

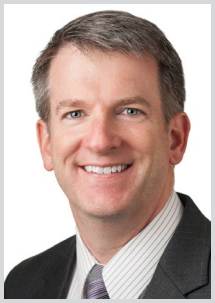
US News & World Report August 8
Insurance Status May Affect Cancer Outcome: Study
Karl Bilimoria was quoted.

Reuters August 6
Tablet-based games may relax anxious kids before surgery
Samuel Seiden's research was featured.

- Seiden's research was also featured on Huffington Post, *Globe and Mail,* Yahoo! Tech, and more.

More media coverage available online.

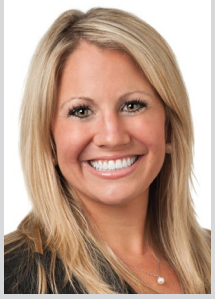
Welcome New Faculty



David E. Conroy, PhD, joins as professor of Preventive Medicine-Behavioral Medicine, deputy director of the Division of Behavioral Medicine, and deputy director of Center for Behavior and Health within IPHAM.

Most recently, Conroy was a professor of kinesiology and of human development and family studies at The Pennsylvania State University. He received his Doctor of Philosophy degree in exercise and sport science, with a concentration in psychosocial and a focus in clinical psychology and statistics, from the University of Utah.

Conroy's research interests focus on the themes of competence and health across the lifespan. In recent years, his focus has shifted toward understanding within-person fluctuations in motivation and health behavior, the influence of automatic motivation processes on health behavior, and the health behaviors of physical activity and sedentary behavior. He has authored or co-authored more than 90 articles in peer reviewed journals and book chapters, and his research has consistently been funded by the National Institutes of Health.



Siobhan M. Phillips, PhD, joins as assistant professor of Preventive Medicine-Behavioral Medicine.

Phillips was most recently a cancer prevention fellow at the National Cancer Institute. She received her Doctor of Philosophy degree in kinesiology with an emphasis in exercise psychology from the University of Illinois, and her masters in public health from Harvard University with an emphasis in quantitative methods.

Her research interests include understanding the biopsychosocial mechanisms underlying the relationship between physical activity and health and disease outcomes in cancer survivors; identifying the determinants of physical activity behavior change and maintenance; the intersection of cancer, aging, and multiple chronic conditions; the role of physical activity in the primary and secondary prevention of cancer; and the translation of research in these areas to practice using technology and innovative study designs and methods.

Sponsored Research

PI: Athanassios Vassilopoulos, PhD Research Assistant Professor of Radiation Oncology

Sponsor: National Cancer Institute (NCI)

Title: "Sirt2 Directs Kras IR Cell Resistance and Tumorigenesis"

One idea of personalized cancer therapy is to identify specific subgroups of cancer patients that will benefit from specific therapeutic strategies. Recently, the NCI has proposed a new research emphasis to design rigorous and innovative research strategies to solve specific problems and paradoxes in cancer research identified as the NCI's "Provocative Questions."

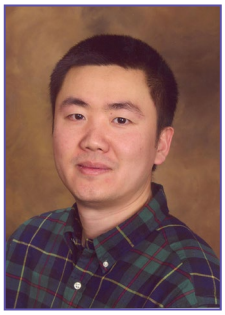
This research proposal addresses one such question "How does the life span of an organism affect the molecular mechanisms of cancer development and can we use our deepening knowledge of aging to enhance prevention or treatment of cancer? In addition, can the pathways that direct life span be used to identify potential molecular biomarkers and targets that can subsequently be used to identify specific groups of malignancies that will respond to targeted anticancer agents?"

Sirtuins are the human and murine homologs of the S. cerevisiae Sir2 deacetylase, which has been shown to regulate replicative and overall lifespan. Sirtuins are energy/nutrient stress sensor proteins that share a common catalytic deacetylase domain and are localized to the nucleus (SIRT1, SIRT6, and SIRT7), mitochondria (SIRT3, SIRT4, and SIRT5), and cytoplasm (SIRT2). Using these findings, it seems reasonable to suggest that sirtuins function as metabolic signaling or fidelity proteins that alter the activity of downstream signaling networks and targets via post-translational modifications involving lysine deacetylation in response to conditions of stress.

Building on this idea, Vassilopoulos has shown that mice lacking the age-related Sirt2 gene develop lung adenocarcinomas. Thus, here it is proposed that cells lacking Sirt2, or exhibiting decreased SIRT2 deacetylation activity, exhibit increased KRAS activity, and this plays a role, at least in part, in the establishment of a lung adenocarcinoma-permissive phenotype. Since activated KRAS mutations are a hallmark in LACa this raises an intriguing question: is it possible that acetylation of KRAS can function as a rheostat to direct activity that is an early event in the initiation of lung adenocarcinomas? Vassilopoulos proposes that the answer is yes.

In addition, identifying a post translational modification which regulates KRAS activity could have important therapeutic implications. First, there are no effective targeted therapies for Ras-driven cancers and, second, impaired activity of KRAS, as it happens when the protein is mutated, is involved in the chemotherapy (CT) and ionizing radiation (IR) tumor cell resistance. Given that KRAS-related cancers are generally refractory to standard therapies due to activated downstream signaling, the finding that acetylation may regulate its activity could reveal a promising therapeutic approach for these malignancies.

These observations highlight the importance of deepening knowledge in the role of post-translational modifications, such as acetylation, that might directly regulate enzymatic activity of the oncogenic driver in KRAS-induced tumorigenesis. Thus, the overarching goal of this proposal is to use Sirt2 knockout mice as a genetic model as well as human tumor samples to investigate a novel mechanism by which acetylation status of KRAS predisposes lung cells to a carcinogenesis permissive phenotype.



PIs: Ming Zhao, PhD Associate Professor in Medicine-Cardiology

Andrew Mazur, PhD Director, Center for Developmental Therapeutics, Chemistry of Life Processes Institute

Sponsor: National Cancer Institute

Title: "Imaging systemic tissue injuries induced by anticancer drugs"

Anticancer drugs are toxic not only to cancer cells but to normal tissues as well. The efficacy of chemotherapies is often limited by a patient's tolerance for their side effects. The National Cancer Institute recently issued a request for proposals that would address provocative questions reflecting high-impact areas in cancer research. One of these questions stated "Since current methods to predict the efficacy or toxicity of new drug candidates in humans are often inaccurate, can we develop new methods to test potential therapeutic agents that yield better predictions of response?"

This project was designed to respond to this call by proposing the development of an imaging technique that can noninvasively assess drug-induced toxicity to internal tissues and organs. The ability to assess toxicity-induced tissue injury in a systemic and timely fashion will facilitate the development of rationale approaches to quantifying toxicity of new drug

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Sponsored Research

(continued from page 8)

candidates during pharmaceutical development and clinical trials. The noninvasive nature of the proposed approach will also enable longitudinal studies that capture the kinetics of tissue injuries over time. This approach will ultimately benefit cancer treatment and help minimize adverse effects for individual patients.

The overall goal of this project is to develop and validate a whole-body imaging technique as a novel approach for characterizing the systemic toxicity profile of anticancer drugs. The technique uses changes in the organization of phospholipids as a biomarker for tissue injuries to develop a systemic toxicity profile. The team's existing data demonstrated that the systemic toxicity profile reflects individual susceptibility to toxic side effects of cancer treatment; providing predictive indicator for drug tolerance, and likely a prognostic indicator for chronic adverse effects.

This interdisciplinary project is a collaborative effort between investigators on the Chicago and Evanston campuses, engaging clinical and basic science expertise from the Department of Medicine, the Chemistry of Life Processes Institute, the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, the Center for Advanced Molecular Imaging, the Center for Molecular Innovation and Drug Development, the Feinberg Cardiovascular Research Institute and the Developmental Therapeutics Core facility.

New X-Ray Irradiator on Campus

Northwestern University Feinberg School of Medicine investigators have a new option for irradiation technology on campus. The Rad Source RS 2000 X-Ray Irradiator is now available for use by all Feinberg scientists.

The RS 2000 features a filtered environment to prevent cross-contamination, touch panel programming of protocols, complete dose mapping, and unique shielding and mounting. The RS2000 is a simple, safe replacement for cesium irradiation.

"It's safer and more efficient for investigators than the old technology, and we're happy to have it open for research on campus," said Jeff Weiss, PhD, director of research core planning.

Investigators interested in learning more about the equipment or scheduling time to use it may contact Jose Macatangay at 312-503-1978 or Joe Princewell at 312-503-8346, both in the Office for Research Safety.

Funding

Research Using Biosamples From Selected Type 1 Diabetes Clinical Studies (DP3)

More information

Sponsor: Department of Health and Human Sciences (HHS), National Institutes of Health (NIH)

Submission deadline: October 20 LOI/ November 20 application
Upper Amount: $4 million

Synopsis: HHS and NIH invite applications for ancillary studies using archived samples from selected diabetes clinical trials and studies. Ancillary studies are expected to generate scientific discoveries on type 1 diabetes primary pathogenesis or the pathogenesis of complications, and biomarkers of disease progression or clinical responses to interventions.

Collaborative Research in Computational Neuroscience (CRCNS)

More information

Sponsor: National Science Foundation

Submission deadline: October 28
Upper Amount: $1.25 million

Synopsis: Computational neuroscience provides a theoretical foundation and a rich set of technical approaches for understanding complex neurobiological systems, building on the theory, methods, and findings of computer science, neuroscience, and numerous other disciplines.

Through the CRCNS program, participating organizations of the NSF, NIH, and the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) support collaborative activities that will advance the understanding of nervous system structure and function, mechanisms underlying nervous system disorders, and computational strategies used by the nervous system.

Two classes of proposals will be considered in response to this solicitation: (1) research proposals describing collaborative research projects, and (2) data sharing proposals to enable sharing of data and other resources.

View more funding opportunities

High Impact Factor Research

July 2014

Barnaby SN, Lee A, **Mirkin CA**. Probing the inherent stability of siRNA immobilized on nanoparticle constructs. *Proceedings of the National Academy of Sciences U S A*. 2014 Jul 8;111(27):9739-44.

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Help Feinberg Track Journals

The Feinberg Research Office regularly tracks research published by Feinberg investigators. The citations are used on web pages, in newsletters and social media, for internal reporting, and more. To more accurately track these journals, the Research Office asks that Feinberg investigators use the following institution name in the address field when publishing in peer-reviewed journals: "Northwestern University Feinberg School of Medicine."

Calendar

Wednesday, September 17

15th Annual Ben Boynton Lecture

"Advances in Sarcopenia Research: Importance of Exercise Training," by Walter R. Frontera, MD, PhD, Vanderbilt University Medical Center.

Time: Noon to 1 p.m.
Location: Rehabilitation Institute of Chicago
Magnuson Auditorium
345 E. Superior St. (Chicago campus)
Contact: mars@northwestern.edu
More information

Thursday, September 18

Bone Marrow Failure Disease Symposium

This symposium will provide updates on the most recent research related to the biology and clinical management of bone marrow failure diseases. Registration required.

Time: 8 a.m. to 12:45 p.m.
Location: Prentice Women's Hospital - Conf. Rm. L
250 E. Superior St. (Chicago campus)
Contact: megan.cahill@northwestern.edu
More information

Monday, September 22

2014 Oncofertility Conference

"Bench to Bedside: Oncofertility Advances in Males and Females," various presenters. Registration required.

Time: September 22 to 23, times vary
Location: Prentice Women's Hospital
250 E. Superior St. (Chicago campus)
Contact: oncofertility@northwestern.edu
More information

Tuesday, September 30

Microbiology-Immunology Seminars

"Using What Phage Have Evolved to Control Gram-Positive Infections," by Vincent Fischetti, PhD, The Rockefeller University.

Time: Noon to 1 p.m.
Location: Lurie Medical Research Building — Baldwin
303 E. Superior St. (Chicago campus)
Contact: shivani.agarwal@northwestern.edu
More information

More Events
Event organizers are encouraged to submit calendar items on Plan-It Purple for consideration. Please contact the Research Office with further questions.

NIH News

NIH has announced a set of loan repayment programs to support qualified scientific researchers by mitigating the burdens of student loan debt. The programs will repay up to $70,000 of student loan debt over the course of a two-year contract. The application cycle opened September 1 and will close November 17. The website explaining the loan repayment programs includes eligibility details and an online application.

The Foundation for the National Institutes of Health has issued a call for nominations for the Lurie Prize in Biomedical Sciences. Nominations are open until October 14 at 1 p.m. (ET). The award recognizes outstanding achievement by a promising young scientist (defined as 52 years old or younger as of January 1, 2015) in biomedical research. The prize is $100,000, to be used however the awardee chooses. Self-nominations will not be accepted.

Sally Rockey, deputy director for extramural research at the NIH, posted a blog entry on progress in meeting the NIH's biomedical research workforce goals, including increasing postdoc stipends, collecting data on postdoc benefits, automating National Research Service Award training grant application tables, the development of a tracking system for trainees, and the creation of an office in the NIH Office of the Director to assess the biomedical research workforce.

NIH has announced the opening of its Transformative Research Award application period through October 10. Given through the NIH Common Fund, these awards go to exceptionally innovative, high-risk, and original or unconventional research with a broad impact. "Applicants are instructed to focus their research strategies on significance and innovation without expectations of providing preliminary data," the NIH announcement notes.

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