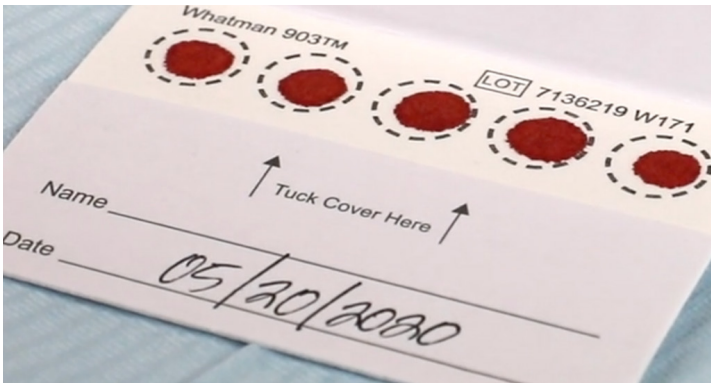
Breakthroughs

Feinberg School of Medicine Research Office

August 2020

Northwestern Takes on COVID-19 Antibody Testing



By Melissa Rohman

As the COVID-19 pandemic continues to spread across the U.S., medical experts and healthcare professionals are urging for federal and local implementation of stricter social distancing measures, accelerated production of personal protective equipment and more testing for SARS-CoV-2, the virus that causes COVID-19.

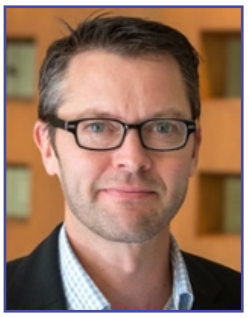
Over the last few months, the emphasis on COVID-19 testing across the country has also expanded to include antibody testing to better understand how much of the population has already been infected, as many cases are asymptomatic.

Specifically at Northwestern Medicine, various antibody testing efforts have been underway since the beginning of the pandemic. These efforts include the development of a more sensitive, at-home test to detect SAR-CoV-2 antibodies and using this test and commercially available antibody tests to determine previous infections of COVID-19 and potential immunity to the virus, both in the Northwestern Medicine community and in the greater Chicagoland area.

Developing a New COVID-19 Antibody Test

Recently, a multi-disciplinary team of Northwestern scientists developed a new, at-home method for testing for SARS-CoV-2 antibodies, which requires just a single drop of blood collected from a finger prick.

The test was developed by Thomas McDade, PhD, the Carlos Montezuma Professor of Medical Social Sciences and of Anthropology at the Weinberg College of Arts and Sciences; Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine; Alexis Demonbreun, PhD, assistant professor of Pharmacology; Brian Mustanski, PhD, professor of Medical Social Sciences, Psychiatry and Behavioral Sciences, and director of the Institute for Sexual and Gender Minority Health and Wellbeing (ISGMH); Richard D'Aquila, MD, director of the Northwestern University Clinical and Translational Sciences Institute (NUCATS) and the Howard Taylor Ricketts, MD, Professor of Medicine in the Division of Infectious Diseases and associate vice president of research; and Nanette Benbow, MA, research assistant professor of Psychiatry and Behavioral Sciences.



Thomas McDade, PhD, the Carlos Montezuma Professor of Medical Social Sciences and of Anthropology at the Weinberg College of Arts and Sciences

Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine

Most viral testing for SARS-CoV-2 has relied on polymerase chain reaction (PCR) analysis, which involves studying a small sample of DNA extracted from a nasal swab to detect the presence of the virus in the body.

On the other hand, serological testing, also known as antibody testing, is able to detect the presence of immunoglobulin M (IgM) and immunoglobulin G (IgG) antibodies in blood samples taken from those who have been previously exposed to the

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Northwestern Medicine®

Antibody Testing *(continued from cover page)*

virus that may potentially neutralize SARS-CoV-2 and provide immunity to the virus; IgG antibodies develop in most patients within seven to 10 days after symptoms of COVID-19 begin and remain in the blood after infection.

Serological testing is useful for determining an individual's prior exposure to a virus, such as SARS-CoV-2. However, there are limitations to current testing approaches: precise lab-based tests which require venous blood are a challenge to conduct during the pandemic when public health mandates limit visits to healthcare facilities and point-of-care tests using finger stick blood are qualitative, often inaccurate and must be conducted in clinical settings.

The newly developed test, detailed in a forthcoming PLoSONE publication, combines the at-home convenience of finger stick blood sampling with the accuracy of quantitative lab analysis.

"Antibody testing essentially allows us to look back in time and see who has been infected, regardless of their symptoms, identify how and where the virus spread, and what factors in the community promote transmission," McDade said.

The test builds on the work of McDade's dried blood spot (DBS) collection method, in which drops of blood are collected from a finger prick and put on a special filter paper sheet to dry. McDade, a biological anthropologist, first developed the method to detect biomarkers of inflammation in non-clinical settings, a method both he and other members of the field have used for numerous population-based studies around the world.

When the COVID-19 pandemic began, McDade realized that the need for SARS-CoV-2 antibody testing in the community was inconsistent with the state of Illinois' stay-at-home order. In response, the team of scientists developed a testing platform that is inexpensive, relatively painless, can be done in non-clinical settings such as one's home, and collected samples can be easily sent back to the lab by mail.

Specifically, the team developed two protocols to detect SARS-CoV-2 IgG antibodies; one for use with standard serum samples, and the other for DBS. Both used enzyme-linked immunosorbent assay (ELISA) procedures to detect these antibodies against the receptor-binding domain (RBD) of the SARS-CoV-2 spike protein, which is located on the surface of the virus and helps the virus enter and infect human cells.

In the lab, the researchers used manufactured RBD and attached it to the bottom of small wells in a format where 96 samples can be tested at once. The dried blood spot is first placed in liquid, and then the liquid, which contains the antibodies from the blood spot, is added to a well of the 96-well plate. If antibodies that recognize the RBD antibodies are present, they will be "captured" by the RBD that is stuck to the plate. A second antibody that is linked to a color response system provides a quantitative result indicating how much anti-RBD is present.

The test can measure antibodies against RBD portion of the virus as an indicator of prior exposure to the SARS-CoV-2 virus with a higher degree of sensitivity and specificity than commercial tests that are currently available.

"We designed our tests to look at the community, whereas commercial tests are really designed to look at hospitalized people. We know hospitalized people have higher levels of antibodies compared to people who had mild or asymptomatic cases of COVID-19," McNally said.

The greatest challenge wasn't actually developing the test itself, but rather the severe shortage of testing materials and supplies, as well as the manpower to mail tests to participants — both due to the pandemic, according to McNally. Due to a shortage in supplies, the team manufactured their own key reagents to develop the test, working at both Northwestern's Evanston and Chicago campuses to ramp up development, validate the test and then build a testing platform that could actually be used in the community.

"We had contacts with many vendors, which enabled us to purchase and manufacture the materials needed for the antibody test. We were already developing ELISAs for another project, so it was very easy to translate what we were already doing for our muscular dystrophy research and implement it in COVID-19 research," Demonbreun said.

Antibody Testing in the Community

Early on, the team was determined to use their test in the community, particularly in Chicago where transmission rates have continued to increase and disparities in rates of transmission and risk of mortality persist. So, in June, the team launched the Screening for Coronavirus Antibodies in Neighborhoods (SCAN) study.

"Much of our approach to COVID-19 has been clinic based, but fundamentally COVID-19 is a community-based problem," McDade said. "That's where our best efforts of prevention should be focused and it's also where the virus is having its most devastating social and economic impact."

SCAN combines the new at-home antibody test with a web-based, no contact research platform developed by a team led by Mustanski to enroll, survey and track participants, as well as

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Antibody Testing *(continued)*

securely return test results once samples are mailed back to the lab and analyzed.

Through this innovative, "pandemic-friendly" approach, the study aims to determine how many people in the community have been exposed to SARS-CoV-2 and developed antibodies to the virus, identify factors in the community that promote or mitigate transmission and, in the long-term, pinpoint what factors may predict future infection or immunity to subsequent infection. The web platform for recruitment, consenting and results reporting uses REDCap, a resource supported by the NUCATS Institute.

Currently, the study is open to Chicago residents living in ten neighborhoods across the city, and to Feinberg essential workers with plans to expand to the rest of Feinberg's workforce. A recent $200,000 RAPID grant awarded to McDade from the National Science Foundation is funding the study which will test 3,000 Chicago residents. In addition, a recently awarded $678,000 supplement grant to the McNally from NUCATS in coordination with the National Institutes of Health will help extend the study to areas beyond Chicago and into the NUgene Project, a genomic biobank sponsored by the Center for Genomic Medicine. She also received an NCATS Administrative Supplement to extend SCAN to eMERGE and NuGene participants.

"The diverse expertise of our team and our strong collaboration have enabled us to do much more than we could individually," D'Aquila said. "I'm most excited that the SCAN platform may be able to contribute to future research aimed at understanding if an immune response, and which type, may protect against reinfection with this virus — we just don't know that yet and it will take time to get those answers we all need to advance public health."

Other antibody testing efforts currently ongoing at Northwestern Medicine are being led by John Wilkins, MD, '11 MSCI, '12 GME, associate professor of Medicine in the Division of Cardiology and of Preventive Medicine in the Division of Epidemiology, and Charlesnika Evans, PhD, MPH, associate professor of Preventive Medicine in the Division of Epidemiology. The duo is currently leading a study that will give every Northwestern Medicine employee — roughly 38,000 individuals — the opportunity to have SARS-CoV-2 antibody testing.

John Wilkins, MD, '11 MSCI, '12 GME, associate professor of Medicine in the Division of Cardiology and of Preventive Medicine in the Division of Epidemiology

In April, Northwestern Medicine began offering free SARS-CoV-2 antibody testing as a benefit to its entire workforce through utilizing a commercially available test developed by Abbott. Recognizing this as a great research opportunity, Wilkins, Evans, and Mark Huffman, MD, MPH, the Quentin D. Young Professor of Health Policy, put together the framework for the study.

"All healthcare workers face some risks for developing COVID-19, so we realized that we needed to have a systematic way to understand how much exposure to this virus is actually occurring in different types of healthcare workers," Wilkins said.

The aim of the study three-fold, according to Wilkins. First, the team wants to understand the prevalence of SARS-Cov-2 IgG positive status and the incidence of developing antibodies against SARS-CoV-2 amongst Northwestern Medicine healthcare workers of all occupations and demographics. They also want to determine what factors may impact a change in a person's antibody status and, lastly, if their risk for developing COVID-19 in the future depends on what their antibody status was previously.

In June, all Northwestern Medicine employees were notified of the antibody testing benefit via email, which included a link to participate in the study. Those interested in participating were asked questions about their demographics, what specific tasks their job involves, any community exposures to SARS-CoV-2 that may have occurred, and whether or not they had COVID-19 or related symptoms in the last four months. Through the link, participants also could schedule a time to get their antibody test.

Over the next year, participants will be sent emails once a month asking them whether or not they believe they have had COVID-19. Participants will also be asked to get a second antibody test in the fall, which will allow the investigators to determine whether the participants' antibody status changes, or doesn't change, over time. So far, more than 6,600 Northwestern Medicine employees have enrolled in the study, which will remain open for enrollment through the fall.

"There are so many fundamental questions about SARS CoV-2 serology that we don't yet understand, and this pandemic is really highlighting why epidemiology is so vital to medical research. To understand the prevalence, incidence and prognosis associated with SARS CoV-2 serologic status and their determinants, we need studies like this." Wilkins said.

CONTENTS

Abdulkadir Wins 2020 Tripartite Prize

By Will Doss

Sarki Abdulkadir, MD, PhD, the John T. Grayhack, MD, Professor of Urological Research and vice chair for research in the Department of Urology, has been named the winner of the 2020 Tripartite Legacy Faculty Prize in Translational Science and Education.

"Northwestern has been transformative in my career," said Abdulkadir, who is also a professor of Pathology and a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. "One of the things I really like is the spirit of collaboration. Some of the students that come into my lab have expertise I don't have, so I can learn from them, and together we can do things that are better than we can do individually."

Abdulkadir's scientific investigation focuses on the molecular pathways that drive prostate cancer, and he's made landmark discoveries in how genetic mutations lead to cellular dysfunction that allow prostate cancers to form and grow. Along with his collaborators, Abdulkadir has identified mutated proteins that that help initiate prostate cancer, and designed small molecules to block these cancer-causing proteins.

Abdulkadir has authored more than 60 peer-reviewed publications, and is currently the principal investigator on three National Institutes of Health grants; two R01 awards and a P50 award. The latter is part of the Specialized Program of Research Excellence (SPORE) in prostate cancer, a five-year $11 million grant that aims to take basic science research from bench to bedside in just five years.

Projects like these underscore Abdulkadir's intense focus on team science, according to Edward Schaeffer, MD, PhD, chair and Edmund Andrews Professor of Urology.

"The environment at Northwestern University is a reflection of who Sarki is; his personality is magnetic, his command of the literature is outstanding and his collaboration is what really makes NU such an amazing environment for people to come and study," Schaeffer said. "We're very pleased that he's part of our department and part of our local environment, and he contributes to the scientific and intellectual environment that is the Northwestern University Feinberg School of Medicine."

This collaborative spirit is perhaps best exemplified by Abdulkadir's commitment to mentorship, and students trained by Abdulkadir have gone on to make striking discoveries of their own. Abdulkadir mentee Jonathan Anker, PhD, graduate of the Driskill Graduate Program in Life Sciences, recently discovered that a unique bacterial strain isolated from a patient with pelvic pain may represent a promising path to treating prostate cancer with immunotherapy.

"Working with him and being able to talk to him, he comes across as very genuine in his love for research, wanting to talk about the project and work through the basic science," Anker said.

Top photo: Sarki Abdulkadir, MD, PhD, the John T. Grayhack, MD, Professor of Urological Research and vice chair for research in the Department of Urology, has been named the winner of the 2020 Tripartite Legacy Faculty Prize in Translational Science and Education. Pictured (below) with Vinay Sargar, PhD, postdoctoral fellow in the Abdulkadir laboratory.

Watch a Abdulkadir, his mentees and colleagues speak about the award here.

Abdulkadir earned combined undergraduate and medical degrees from Ahmadu Bello University in Zaria, Nigeria, before earning a PhD in immunology from Johns Hopkins University in Baltimore as a fellow of the Howard Hughes Medical Institute.

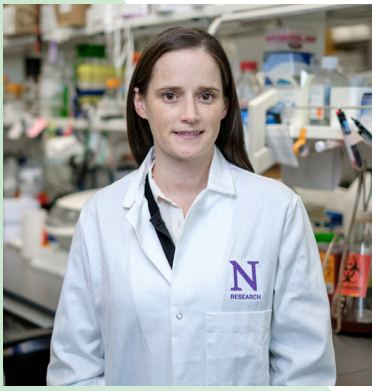
He undertook a combined clinical pathology residency and postdoctoral fellowship at Washington University School of Medicine in St. Louis, and served as a faculty member in pathology at the University of Alabama in Birmingham and at Vanderbilt before coming to Northwestern University Feinberg School of Medicine in 2013.

This award is typically presented at the annual Lewis Landsberg Research Day every April. Research Day was canceled this year after much deliberation and with the safety of the Northwestern community in mind.

Please note that the next Research Day is scheduled for Friday, October 1, 2021.

The Role of Circadian Clocks in Metabolic Diseases

Clara Peek, PhD, GME '15, assistant professor of Biochemistry and Molecular Genetics and of Medicine in the Division of Endocrinology



Clara Peek, PhD, '15 GME, is an assistant professor of Biochemistry and Molecular Genetics and of Medicine in the Division of Endocrinology. Her lab aims to uncover the physiological impact of the circadian clock on nutrient-responsive regulatory pathways and use these findings to understand the role of circadian clocks in metabolic diseases such as type 2 diabetes and cancer. She is a member of the Center for Diabetes and Metabolism, the Simpson Querrey Institute for Epigenetics and the Robert H. Lurie Comprehensive Center of Northwestern University. Watch a video about her lab.

Q&A

What are your research interests?
Our laboratory is working to understand the interplay between metabolic and circadian transcriptional pathways, both at the genomic and nutrient-signaling levels, and applying these findings to understand the role of circadian clocks in pathologies such as type 2 diabetes, obesity and cancer.

What is the ultimate goal of your research?
The overarching goal of our research team is to broaden our understanding of circadian metabolism and pinpoint the impact of misaligned circadian timing in human disease.

How did you become interested in this area of research?
I have always had an interest in metabolism. As a graduate student, I studied the molecular mechanisms by which yeast cells sense nutrients in their environment to respond to different types of stress. Late in my graduate studies, I became aware of emerging evidence for a striking connection between circadian disruption such as jetlag and shift work and the prevalence of metabolic diseases and cancer. I was fascinated with the concept of a cellular mechanism to align internal processes in anticipation of the changing demands across the 24-hour day.

It was around that time that the existence of autonomous "peripheral" clocks in metabolic tissues was discovered, yet circadian timing was (and still is) rarely considered in biomedical research. Therefore, I decided I wanted to join the group of scientists tackling this fundamental process in hopes of understanding more about human metabolism and disease.

How is your research funded?
We have been fortunate to receive multiple grants from the National Institute of Diabetes and Digestive and Kidney Diseases, as well as funding from the Lurie Cancer Center.

Where has your work been published?
Over the past three years, I have published in *Cell Metabolism* and contributed to five other papers stemming from a number of exciting collaborations both inside and outside of Northwestern. In addition, I have recently published a review article on circadian clocks and oxygen-sensing in *Trends in Endocrinology and Metabolism*.

Who inspires you? Who are your mentors?
I feel lucky to have had many exceptional teachers, collaborators and mentors over the course of my career who believed in me, pushed me and were always available to offer support. In particular, my graduate advisor, Peter Espenshade, PhD, from Johns Hopkins University School of Medicine and postdoctoral advisor, Joseph Bass, MD, PhD, have played important roles in my career. They taught me many invaluable skills and provide the foundation for how I wish to grow and develop my own research program. I hope that I can provide the same quality mentorship to my trainees and team as I have received.

Studying Transcription Factor Myc and its Role in Cancer Growth

Austin Holmes, fourth-year student in the Driskill Graduate Program

Austin Holmes is a fourth-year student in the Driskill Graduate Program in Life Sciences (DGP) who studies the transcription factor Myc in the laboratory of Debabrata Chakravarti, PhD, vice chair for Translational Research in the Department of Obstetrics and Gynecology. Myc is upregulated in many cancers, so reducing expression or inhibiting the transcription factor is theorized to slow or stop cancer growth.

Q&A

Where is your hometown?
My family moved throughout the western suburbs of Chicago before my college years, but I've always thought of Chicago as my hometown. Ever since I could ride a bike or skateboard, I was a quick train ride away enjoying all that Chicago has to offer — especially the lake.

What are your research interests?
My first real obsession with biology stemmed from learning the Central Dogma (the process by which the instructions in DNA are converted into a functional product). As knowledge and technology progressed, both my education and science as a whole focused more on the interplay of DNA, RNA and Protein.

My primary research interest lies within the transition from DNA to RNA, in other words, transcription. This comes full circle in that I study how transcription factors interact with DNA to produce RNA. I'm also interested in epigenetics, gene transcription and chromosome architecture in the context of human diseases like cancer.

My undergraduate research ignited a passion for computer science and the use of high-performance computing, and I've expanded my knowledge base to next-generation sequencing data analysis and big data integration.

Here at Feinberg, I use biochemical, CRISPR and state-of-the-art NGS approaches to predict changes in transcription factor activity, and chromatin alterations in multiple disease models in the laboratory of Debabrata Chakravarti, PhD.

What exciting projects are you working on?
I work with a well-known transcription factor called Myc. In a collaborative initiative with the laboratory of Sarki Abdulkadir, MD, PhD, my project details epigenetic and transcriptional consequences of inhibiting the Myc oncogene by a recently discovered small molecule.

We hope our exciting results will expose cancer cell vulnerabilities for synergistic targeting and potential therapy resistance mechanisms.

What attracted you to your program?
I chose Feinberg because of its significant strengths in basic and translational epigenetics, genomics and gene regulation. Even in my 3rd year, I've had countless opportunities to collaborate and communicate with experts within my primary research interests. I knew I could learn from some of the best and get opportunities to meet outstanding investigators visiting for seminars and symposia.

What has been your best experience at Feinberg?
I am lucky to have the opportunity to explore my ideas here. Other than my own research, I thoroughly enjoyed my teaching assistant experience with carcinogenesis class.

Cancer research is proliferating vastly, and this course helped students identify key characteristics of how we study cancer biology. I learned a lot and was thoroughly impressed with Northwestern students abilities' to take on a challenge and succeed.

How would you describe the faculty at Feinberg?
The faculty are fully invested in students, consider us as equals and motivate us to conduct rigorous and high impact research.

What do you do in your free time?
I really enjoy organic gardening and growing indoor for year-round harvest. I'm fortunate enough to have yard space in the city for flowers and vegetables.

What are your plans for after graduation?
I will be pursuing a post-doctoral position in academia or industry, after which I want to establish my own laboratory. I hope to continue research with sights on new discoveries: There is so much to discover!

Improving the Life Cycle of Research Administration

Stephanie Maras, MA, research administrator in Basic Science Administration

Stephanie Maras, MA, is a research administrator in the Basic Science Administration (BSA) at Feinberg. She supports a wide range of investigators and is interested in improving the life cycle of research administration, relieving investigators of that burden so they can focus on science.

Q&A

Where are you originally from?
I was born and raised on the South Side of Chicago.

What is your educational background?
I've attended several kinds of schools, but I'm a Chicago Public Schools kid at heart. I attended the University of Chicago and Northwestern, completing my undergraduate degree in organization behavior. This spring I graduated with a master's degree in public policy and administration from Northwestern.

Please tell us about your professional background.
Before I migrated to Northwestern in 2018, I spent ten years at the University of Chicago working in research administration, including research center and program management.

For the majority of my time at the University of Chicago, I helped build and manage a Nobel laureate's large economics research center, from grant writing, administration and reporting to project management, conferences, human resources and financial management.

One of my more unusual projects was repurposing two historic homes into office space, and because of that experience I will never design or build my own house. After I left that position, I served as a grants officer in their central sponsored research office for two years.

Why do you enjoy working at Northwestern?
As a research administrator in Basic Science Administration (BSA), I'm excited to support amazing scientists who are dedicated to fighting insidious diseases like HIV. In doing so, I'm able to work at both the BSA and laboratory level to really understand the life cycle of research administration at Northwestern, satisfying my natural curiosity about how systems and processes work and how to improve on them. Northwestern's inclusive environment, investment in my professional development and my wonderful peers have also really made the past two years very meaningful to me.

How do you help scientists and/ or research students at the medical school?
Aside from BSA responsibilities, I primarily support the lab of Thomas Hope, PhD in the Department of Cell and Developmental Biology. Working with approximately 25 scientists, technicians and students, I support grant proposal development and submission as well as award management.

This encompasses matters such as financial management, compliance, and reporting. I strive to help scientists with their administrative burden so they can focus on research.

What is your favorite part of the job?
Aside from the Hope laboratory's amazing mission and my BSA peers, I particularly enjoy working with early-career scientists. My service orientation and curiosity easily coalesce when helping young investigators pursue sometimes unusual opportunities or learn to manage their awards to further their research goals.

I think the hallmark of a successful lab is the success of its young scientists, and learning to obtain and use grant funds appropriately are vital skills which will help them reach the next level of their career.

What exciting projects are you working on?
Hope and his team have been invited to participate in Operation Warp Speed to find a vaccine for COVID-19, and I have been proud to support the team's effort. I've been so impressed with the resiliency of the lab and BSA as we find a new normal, and I'm really happy to be involved in SARS-CoV-2 research, however tangentially.

What do you like to do in your spare time?
I love to explore my imperfect city. Pre-COVID that included walking around with my American Institute of Architects' guide, checking out concerts and neighborhood festivals, volunteering with groups like the Chicago Metro History Fair, or visiting favorite haunts like the Art Institute, Music Box Theater or Wrigley Field.

I'm one of the few, but proud, south side Cubs fans. Currently, reading has substituted for a lot of activities these days, but I look forward to resuming my explorations.

Anything else we should know about you?
Instead of baking sourdough during the shutdown, I accidentally started a greenhouse in my apartment and jungle on my back porch. I'm going to have a lot of tomatoes.

CECD Continues to Support Diversity Initiatives

NUCATS Corner
Clinical and Translational Sciences Institute

For the first time, the Northwestern Clinical and Translational Sciences (NUCATS) Institute has received supplemental funding from a National Institutes of Health (NIH) diversity supplement program.

The grants were awarded to Ange-Therese Akono, PhD, the Louis Berger Junior Professor of Civil and Environmental Engineering in the McCormick School of Engineering,and Aderonke Bamgbose Pederson, MD, (pictured above) instructor of Psychiatry and Behavioral Sciences, by the National Center for Advancing Translational Sciences (NCATS).

"The push for diversity within academic medical centers is beginning to change the makeup of our workforce; however, data still show that minority populations are underrepresented in each phase of a translational scientist's career, from medical or graduate school through senior leadership," says Richard D'Aquila, MD, NUCATS director, senior associate dean for clinical and translational research, associate vice president of research and the Howard Taylor Ricketts, MD, Professor of Medicine in the Division of Infectious Diseases. "The Institute's Center for Education and Career Development (CECD) is committed to helping junior faculty obtain these grants to help launch productive research careers as we partner with funding organizations to enhance the diversity of our research community."

The NCATS-Clinical and Translational Science Awards (CTSA) Program diversity supplement is designed for individuals from groups underrepresented in the biomedical sciences, including racial and ethnic minorities, persons with disabilities and individuals from economically and educationally disadvantaged backgrounds.

Both Akono and Pederson will use CECD resources to better position themselves for careers in research. As part of the NUCATS Institute's commitment to diversity and inclusion across the translational spectrum, the CECD will collaborate with Feinberg investigators to identify additional supplement opportunities, with the goal of increasing the number of supplements awarded to Feinberg faculty.

"If Drs. Akono and Pederson use this experience to build their laboratories and become successful investigators who then turn around to mentor diverse scientists who follow them, the impact of these awards will be magnified and accelerate us towards our goal of diversifying our faculty." says Mercedes Carnethon, PhD, codirector, vice chair of the Department of Preventive Medicine and the Mary Harris Thompson Professor of Preventive Medicine in the Division of Epidemiology and professor of Medicine in the Division of Pulmonary and Critical Care.

If a faculty member is interested in applying for an award or matching with a student or trainee to apply for one, please email Carnethon, who will work to match eligible students, postdoctoral trainees and early faculty who express an interest in diversity supplements.

"We have built out our infrastructure by creating a website that serves as a mechanism to pair candidates for diversity supplements with research opportunities led by our faculty, says Carnethon. "In doing so, we hope to build upon on our current success with these first two NUCATS diversity supplements."

CTSA Program diversity supplements are offered once a year. The deadline to apply is November 1, however, the process to identify applicants and ensure that their submissions are competitive begins in July. Each NIH funding agency has its own deadline and specific guidelines for diversity supplements. Learn more, here.

The NUCATS Institute is supported, in part, by the National Institutes of Health's National Center for Advancing Translational Sciences, Grant Number UL1TR001422.

Welcome New Faculty

Mohamed Abazeed, MD, PhD, joins as an associate professor in Radiation Oncology. Previously, he was assistant professor in the Department of Radiation Oncology at the Cleveland Clinic. His research goal is to personalizing cancer care by helping physicians recommend treatments based on the genetic, imaging and clinical features of individual tumors. His laboratory studies tumoral heterogeneity, tumor evolution and alterations in the genome that confer therapeutic resistance. Using computational and mathematical models, they synthesize findings in order to predict therapeutic responses to individual anti-cancer therapies and guide those treatments.

Sponsored Research

PI: Pablo Penaloza-MacMaster, PhD, assistant professor of Microbiology-Immunology

Sponsor: National Institute on Drug Abuse

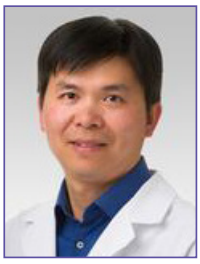
Title: Interferon-Modulated Vaccines Against HIV

We have elucidated a strategy to improve viral vaccines by combining IFN-I receptor antibodies with the vaccine. Our data show that this approach improves the efficacy of multiple viral vaccines, including the clinically approved yellow fever vaccine and experimental HIV vaccines in mice.

Such data provide impetus for testing whether IFN- modulation can also improve the efficacy of HIV vaccines in primates and humanized mice challenged intravenously with HIV. These data are potentially translatable to humans, since there is a similar antibody that has undergone extensive clinical testing in humans to block IFN-I (Anifrolumab).

An estimated 1.7 million people became infected with HIV in 2018, and among infected people, intravenous drug users are among the most affected due to poor adherence to therapy. Thus, a highly immunogenic HIV vaccine is needed; we will evaluate a novel HIV vaccine concept that maximizes systemic immunity by modulating the interferon pathway.

Read more



PI: Bin Zhang, MD, PhD, professor of Hematology and Oncology and of Microbiology-Immunology

Sponsor: National Cancer Institute

Title: The Distinct Role of Cysteinyl Leukotriene Receptor for Myeloid-Derived Suppressive Cells

Myeloid-derived suppressor cells (MDSCs) accumulate in the blood, lymph nodes, bone marrow and at tumor sites in most patients and animals with cancer, suppressing anti-tumor immunity. Therefore, they present a significant impediment to cancer immunotherapy. The mechanisms and in situ conditions that regulate and sustain MDSC differentiation and survival, along with the mechanisms MDSCs use to promote tumor progression, remain largely unknown.

Our preliminary data demonstrate the importance of type 1 cysteinyl leukotriene receptor (CysLTR1) for the accumulation and immunoregulatory activity of MDSCs in the cysteinyl leukotrienes (CysLTs)-rich tumor microenvironment. These results have led to the novel hypothesis that CysLTR1 signaling is essential in tumor-induced MDSC accumulation for both immune suppression and tumor promotion.

In this proposal, we will characterize further the phenotype and function of MDSCs in the tumor microenvironment, and explore the signaling pathways implicated by CysLTR1 in regulating MDSC differentiation, turnover and function, using both gain-of-function and loss-of-function approaches.

Read more

Research in the News

***Reuters,* June 26**
Scientists just beginning to understand the many health problems caused by COVID-19. Igor Koralnik, MD, and Sadiya Khan, MD, MSc, were mentioned.

***The Washington Post*, July 2**
This coronavirus mutation has taken over the world. Scientists are trying to understand why. Egon Ozer, MD, PhD, was mentioned. This research was also featured in *Yahoo! News* and *MSN*.

***WGN*, July 2**
Antibody tests helping researchers come up with answers
Thomas McDade, PhD, was mentioned.

***The Washington Post*, July 9**
Study results suggest pregnant women may be able to transmit coronavirus to their babies

***TODAY*, July 17**
Why racism can have long-term effects on children's health
Nia Heard-Garris, MD, MSc, was mentioned.

***WTTW News*, July 23**
Local Researchers Develop Wearable Sensor to Monitor COVID-19 Symptoms. John Roger, PhD, was mentioned.

***NBC Chicago*, July 24**
New Study Highlights Impact of Coronavirus Pandemic on Families' Mental Health. Matthew Davis, MD, was mentioned.

***Fox 32 Chicago*, July 27**
New therapy shows promise in fighting aggressive forms of breast cancer. Chad Mirkin, PhD, was mentioned.

***Chicago Tribune*, July 27**
Northwestern seeks 5,000 volunteers to participate in COVID-19 vaccine trials. Karen Krueger, MD, was mentioned. This research was also featured in *Yahoo! News*.

More media coverage

Funding

PrEP for HIV Prevention among Substance Using Populations (R01 - Clinical Trial Optional)

More information

Sponsors: National Institute on Drug Abuse (NIDA), National Institute of Allergy and Infectious Diseases (NIAID)

Letter of Intent Deadline: October 12
Submission Deadlines: November 12
Upper Amount: $2.5M

Synopsis: NIDA is interested in research that addresses research gaps related to PrEP and its use among substance users, with the goals of improving PrEP management and implementation. Current U.S. Public Health Service PrEP guidelines recommend PrEP for people who inject drugs (PWID) and mention alcohol and illicit drug use as potential concerns for clinical management. Only one clinical trial has evaluated PrEP among PWID and systematic data regarding the broader use of PrEP among substance users are limited. There is a need to better understand the effects of substance use on PrEP effectiveness and better inform PrEP implementation among substance users. More systematic data are needed regarding the impact of substance use on PrEP management and adherence, along with investigating potential unintended consequences of PrEP use that may be unique to substance users. Applications are encouraged that propose research in states and counties identified in the U.S. Government's Ending the HIV Epidemic (EtHE) initiative as described here. Applications to work in locations that are not included in the EtHE initiative must provide an epidemiologic justification for their inclusion in the research.

Digital Healthcare Interventions to Address the Secondary Health Effects Related to Social, Behavioral and Economic Impact of COVID-19 (R01 - Clinical Trial Optional)

More information

Sponsor: National Institutes of Health; See "more information" for complete lists of sponsors

Submission Deadlines: December 2
Upper Amount: $750K in direct costs per year

Synopsis: This award aims to support research to strengthen the healthcare response to COVID-19 caused by SARS-CoV-2 and future public health emergencies, including pandemics. While research related to the direct clinical effects of COVID-19 are supported by other funding opportunities, the purpose of this funding is to focus on the role and impact of digital health interventions (e.g., mobile health (mhealth), telemedicine and telehealth, health information technology and wearable devices) to address access, reach, delivery, effectiveness, scalability and sustainability of health assessments and interventions for secondary effects (e.g., behavioral health or self-management of chronic conditions) that are utilized during and following the pandemic, particularly in populations who experience health disparities and vulnerable populations.

Mid-Career Enhancement Awards to Integrate Basic Behavioral, Biomedical and/or Social Scientific Processes (K18 No Independent Clinical Trials)

More information

Sponsor: National Institutes of Health; See "more information" for complete list of sponsors

Submission Deadline: March 17, 2021
Amount: 35K in direct costs and reimbursement for a percentage of indirect costs

Synopsis: This program intends to support investigators who strive to expand their research trajectories through the acquisition of new knowledge and skills in the areas of basic psychological processes, sociological processes and/or biomedical pathways – expertise that is beyond and enhances their current areas of expertise. The program will support career development experiences and a small-scale research project that will provide experienced investigators with the scientific competencies required to conduct independent research projects that more thoroughly investigate interrelationships among behavioral, biological, endocrine, epigenetic, immune, inflammatory, neurological, psychological and/or social processes. Applicants may propose research that involves non-human animals (basic experimental studies with humans should apply to the companion funding announcement PAR-20-226), secondary data analyses or other career development projects that do not involve leading an independent clinical trial, a clinical trial feasibility study or an ancillary study to a clinical trial. Eligible candidates are independent investigators at mid-career faculty rank or level.

View COVID-19 funding opportunities

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Planning a Systematic Review: Using PRISMA-P

By Eileen Wafford, Research Librarian

Teams conducting a systematic review have access to various tools and resources to help manage the multi-step process. A key tool is the PRISMA-P checklist, which contains three sections and 17 essential items to consider and report when planning your review. Using PRISMA-P ensures you develop a publication-ready protocol that will meet journal submission and peer reviewer expectations. Here, we highlight key sections and selected items from the PRISMA-P checklist as well as a number of resources to take your systematic review planning to the next level.

Section 1: Administrative Information

Item 2 in Section 1 of the PRISMA-P checklist requests protocol registration information. Teams can register their protocol free on PROSPERO, an international protocol registry. Other registration options are journals such as Systematic Reviews and institutional repositories such as Northwestern Medicine's DigitalHub.

Section 2: Introduction

The introduction section presents the rationale (Item 6) and objectives (Item 7) of the review. Teams should consider PICO the (patient/population/problem, intervention/exposure, comparator, and outcomes) framework to identify key elements of their rationale and objectives. PICO is similarly useful in identifying information for the eligibility criteria (Item 8) reported in the next section.

Section 3: Methods

As systematic reviews attempt to "identify, appraise and synthesize all the empirical evidence," it is important to search multiple information sources (Item 9). Along with MEDLINE via PubMed or Ovid, teams should search other databases with in-depth coverage in the relevant discipline. Examples are:

- The Cochrane Library – connects to a collection of databases with high-quality evidence.
- Embase – contains strong coverage of research on drug events, drug efficacy studies, medical devices, and disease-related research from international sources.
- PyscInfo - provides abstracts and citations in behavioral and social sciences research.
- CINAHL Plus with Full Text – covers topics related to nursing and allied health.

Review teams should also consider incorporating grey literature, which Cochrane defines as "reports published outside of traditional commercial publishing," to minimize publication bias. Sources of grey literature include dissertations and clinical trial protocols, such as those found in clinicaltrials.gov. Galter's bibliographic databases and grey literature sources page lists additional information sources.

Item 11b of the PRISMA-P checklist asks for details on the screening process. Rayyan and Covidence are web-based tools designed to facilitate blind screening by multiple reviewers. Rayyan is free while Covidence requires teams to purchase a plan. Covidence also offers the ability to assess the risk of bias along with customizable data extraction forms.

There is no standard data extraction form; however, the Cochrane Collaboration provides recommendations and templates that can be modified for each review. Teams can create their forms using Microsoft Excel or Google forms. Just remember to cite the source and describe the data extraction plan on Item 11c of the PRISMA-P checklist.

The Cochrane Collaboration's approach to bias helped shape the PRISMA reporting guidelines. This approach distinguishes bias (Item 14) from quality (Item 17). The Tools for Reviewers page on the Reporting Research and Evaluating Studies GalterGuide lists several risk of bias checklists. Teams can use the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach to assess the quality of the included studies.

Galter Health Sciences Library and Learning Center offers the class, Conducting a Systematic Review: Part 2 - Tools & Resources, which explores the tools presented in more depth. Systematic review teams can also meet with their liaison librarian for more information about these tools and the systematic review process.

High-Impact Factor Research

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NIH News

NIH Releases COVID-19 Strategic Plan

On July 13, the NIH released a strategic plan for COVID-19 research, which provides a framework describing how the NIH is accelerating the development of therapeutic interventions, vaccines and diagnostics in response to the global pandemic. It describes how the NIH is rapidly mobilizing the biomedical research community by establishing new programs that leverage existing resources to lead a swift, coordinated research response, for example.

The plan outlines five cross-cutting strategies:

1. Invest in NIH and NIH-funded investigators to increase fundamental and foundational knowledge of SARS-CoV-2 and COVID-19.

2. Speed innovation in COVID-19 testing technologies through NIH's recently launched Rapid Acceleration of Diagnostics (RADx) initiative, which aims to deliver rapid, widely accessible testing strategies to the public.

3. Participate in public-private partnerships, such as NIH's Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership and federal partnerships such as Operation Warp Speed, to forge groundbreaking approaches that speed identification, development, evaluation and manufacturing of promising candidate therapeutics and vaccines.

4. Support studies on preventative treatments and behavioral and community prevention practices to identify and implement effective approaches for promoting individual and community safety.

5. Ensure that diagnosis, treatment and prevention options are accessible and available for underserved and vulnerable populations which have been at greatest risk for the most severe threats of the disease.

Read the NIH-Wide Strategic Plan for COVID-19 Research here.

New Steps to Help Ensure Safe Work Environments for NIH-Supported Research

The Advisory Committee to the NIH Director's Working Group on Changing the Culture to End Sexual Harassment identified areas of improvement toward creating a safe work environment. NIH seeks to close gaps by implementing a new reporting process for institutions requesting approval to remove principal investigators (PI) or other senior key person named in the grant due to concerns of harassment, bullying, retaliation or other hostile working conditions. NIH has also set expectations to be notified if institutions request a change of recipient institution and there are concerns about safety and/or work environment involving PIs. Read more about how NIH is strengthening the reporting of sexual harassment and other professional misconduct at NIH-funded research institutions in Michael Lauer, MD, and Carrie Wolinetz's, PhD, *Open Mike* blog post.

Inclusion Reporting and Human Subjects and Clinical Trials Information Form Updates

NIH grant recipients are required to submit participant-level data on sex/gender, race, ethnicity and age at enrollment in progress reports. Recipients must upload participant-level data in the Human Subjects System (HSS) using the template provided. This individual-level data will then populate the cumulative enrollment tables. Take a moment to view this short video about submitting participant-level data and become familiar with the data template.

Additionally, as of June 13, all post-submission updates in HSS must use the FORMS-F version of the PHS Human Subjects and Clinical Trials Information Form. Study records now require an inclusion enrollment report title and clinical trials must indicate whether they are an applicable clinical trial. For a guided review of the updated form, click here. The six-minute video will show how to use the latest version of the form and how to complete both delayed onset and full-study records. The video describes each of the five sections of a study record and points out which fields are required for human subjects and clinical trial studies. For a summary of significant form changes and detailed guidance for completing the form, check out the FORMS-F application instructions.

Featured Core

The Flow Cytometry Core Facility

The Robert Lurie Comprehensive Center of Northwestern Univeristy's Flow Cytometry Core Facility (Lurie Flow Core) was established to serve the needs of investigators at the Cancer Center, Northwestern University's Feinberg School of Medicine, Northwestern University and other affiliated institutions, whose studies require the measurement of numerous characteristics of intact cells in a mixed population and the isolation of specific subpopulations for further downstream analysis.

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Managing Director, Suchitra Swaminathan, PhD, suchitra-swaminathan@northwestern.edu

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