Breakthroughs

Feinberg School of Medicine Research Office

March 2021

Northwestern Medicine Scientists Track COVID-19 Variants

By Melissa Rohman

Like all viruses, SARS-CoV-2—the virus that causes COVID-19—has continued to mutate and evolve, sometimes producing different variants that spread more quickly and are more contagious. Since March 2020, a team of Northwestern Medicine scientists based in the Division of Infectious Diseases and supported by the Emerging and Re-emerging Pathogens Program (EREPP) have been tracking the evolution of SARS-CoV-2, specifically in the city of Chicago. Their work has been pivotal in understanding how the virus spread to Chicago and what new variants have emerged in the city.

In January 2021, the Chicago Department of Public Health and the Illinois Department of Public Health announced that the team had found Illinois' first case of a SARS-CoV-2 variant that was originally identified in the U.K., called B.1.1.7. Evidence suggests that this variant, which was first detected in the U.S. in December 2020, spreads more easily and quickly than other known variants.

In early March 2021, the team also identified the first case of the COVID-19 variant first identified in Brazil, called P.1. The variant, which was first identified in the U.S. in January, has several mutations in the virus' notorious spike protein, including one shared with the U.K. variant. Research suggests that the variant's additional mutations may affect its ability to be recognized by antibodies. However, it is still unclear whether either variant causes more severe disease.

"It's important to stay ahead of the game and know which strains are emerging, where they are emerging and what the implications of the new mutations are. These are all critical tools for public health departments to plan their interventions," said Babafemi Taiwo, MBBS, '06 GME, the Gene Stollerman Professor of Medicine and chief of Infectious Diseases.

The team working on tracking the virus includes Ramon Lorenzo-Redondo, PhD; Egon Ozer, MD, PhD, '08, '12 GME; Judd Hultquist, PhD; Lacy Simons; Michael Ison, MD, MS; Chad Achenbach, '02 MD, '02 MPH and Alan Hauser, PhD. Lindsay Morrison, MD, a current fellow in the Department of Infectious Diseases, and former fellows Scott Roberts, MD, and Hannah Nam, MD, also contributed to the team's research.

Always on the Lookout

Viruses have one main goal: to replicate themselves by mutating and spreading to as many hosts as possible as quickly as possible. This process, however, is error-prone — when a virus copies its genetic material inside host cells, it will generate many errors, most of them neither helping nor hurting the virus. However, there are certain instances when

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Northwestern Medicine®

Tracking Variants

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a mutation may actually improve a virus' ability to infect and replicate, ultimately leading to a new variant of the virus.

"We are always going to see viruses evolving and changing because that's just in their nature," Lorenzo-Redondo said. "Sometimes a mutation might be so advantageous in a specific environment that it generates what is called a 'bottleneck' in the population and the genetic characteristics of this improved mutant get transmitted to the next generations, generating a new viral lineage. If this mutation makes the viruses much better at infecting or replicating than other lineages already present, this new lineage might be able to expand or even take over the viral population. That's how some of these biologically relevant variants might have appeared."

Shortly after the first case of COVID-19 was identified in the U.S., the research team applied for Institutional Review Board approval to obtain residual diagnostic tests from patients at Northwestern Memorial Hospital and from patients who received COVID-19 testing at Northwestern Medicine's outpatient centers. To date, they have collected more than 6,000 positive COVID-19 samples from across the city.

With the samples secured, the team immediately got to work. The samples were first sorted and banked by Simons and Hultquist, who then extracted viral RNA from each sample, converted it into DNA and amplified it by polymerase chain reaction (PCR). Next, the team led by Ozer used deep sequencing approaches to determine and assemble entire genome sequences of the viruses isolated from each patient. These sequences were then analyzed by Lorenzo-Redondo using phylogenetics, a method which incorporates clinical and geographical data to build family trees of the virus in order to understand the forces behind its evolution.

From this data, the team was able to trace the origins of the virus in the Chicago area and identify new, circulating variants. This approach enabled them to identify the U.K. variant of the virus in the city and alert local and state public health departments. Contract tracing performed by the Chicago Public Health Department would later reveal that the person who tested positive for the strain had traveled to the U.K. and the Middle East two weeks prior to testing positive.

From top, r-l; Ramon Lorenzo-Redondo, PhD; Egon Ozer, MD, PhD, '08, '12 GME
From bottom r-l; Judd Hultquist, PhD; Lacy Simons

"This makes Chicago a very interesting place to study the virus because it has one of the most connected airports in the world," Lorenzo-Redondo said.

By the end of May 2020, the team had compiled a comprehensive dataset of genetic sequencing information from samples obtained at Northwestern Memorial Hospital. This dataset is now publicly available for use by the greater scientific community and public health departments around the world.

The team is also working to create two additional biobanks with the samples: a collection of serial blood samples from COVID-19 patients and a collection of serial SARS-CoV-2 samples from infected patients. According to the team, these biobanks will be essential for tracking the virus as it continues to evolve inside the host. In addition, these resources will enable investigators to better understand how current and emerging variants respond to treatments, and what immune responses and biomarkers may indicate certain patient outcomes.

An Ongoing Race

At the beginning of the pandemic, there was no pre-existing immunity to the virus and so it simply evolved to infect faster and better. Now, because more and more people have immunity to the virus, either due to vaccination or previous infection, the virus is pressured to adapt and evade immunity all together.

"What this is telling us is that we are allowing the virus to become better by replicating, generating diversity and selecting mutations."Lorenzo-Redondo said. "We need to lower the prevalence of the virus because if not, the virus is going to keep evolving."

In addition to lowering the number of COVID-19 cases, constantly monitoring known and emerging variants is critical

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to ensure public health measures are continuously updated and most effective. The team is also partnering with other groups locally, nationally and internationally so genomic sequencing of SARS-CoV-2 and its variants can be widely adopted.

“The concern here is that eventually you’ll end up with a strain that’s no longer going to be protected against by the vaccine, that’s the long-term concern," Hultquist said. "The problem is we have no way of predicting exactly when a variant like that could."

That’s why vaccinating as much of the general population as soon as possible is so important, Hultquist said. Currently, there are three COVID-19 vaccines approved by the Food and Drug Administration for authorized use: mRNA vaccines from Pfizer-BioNTech and Moderna, each requiring two separate doses, and the most recently approved one-dose viral vector vaccine from Johnson & Johnson.

While each vaccine differs in technology and efficacy, new research suggests that they may be less effective in protecting against some variants of COVID-19. The good news, Hultquist said, is that these vaccines can be updated by the manufacturer to be more responsive to new variants if they arise, similar to how the flu vaccine is updated annually.

One thing that is certain, however: the same safety measures used to contain COVID-19 — including handwashing, masking and social distancing — will work against known and emerging variants.

“These variants can’t be more easily transmitted or overcome a vaccine or the immune system if it never gets to you in the first place," Ozer said. "We have to continue to take these precautions for now regardless of what variants come next."

Listen to Tracking COVID-19 Variants with Ramón Lorenzo-Redondo, PhD on Feinberg's Breakthroughs *podcast.*

Oliver to Receive Benditt Award for Pioneering Research on Lymphatic System

Guillermo Oliver, PhD, has been selected to receive the 2021 Earl P. Benditt Award in recognition of his work to better characterize the lymphatic system, the North American Vascular Biology Organization (NAVBO) announced. The award honors a scientist who has made an outstanding discovery or developed a concept that has been seminal to the understanding of vascular biology.

Oliver is the Thomas D. Spies Professor of Lymphatic Metabolism at Northwestern and the director of the Center for Vascular and Developmental Biology at the Feinberg Cardiovascular and Renal Research Institute. He is known for his pioneering research on the lymphatic system, including identifying Prox1 as the first specific marker for lymphatic endothelial cells.

Previously regarded as passive conduits for fluid and immune cells, lymphatic vessels are now recognized as active factors in major physiological and pathophysiological processes including obesity and metabolism, cardiovascular diseases, neurological disorders, glaucoma, inflammatory processes and cancer.

“The creation of the next generation of scientists is arguably the most important contribution a senior scientist can make, and in the case of Dr. Oliver he has populated an entire field of vascular biology,” Oliver’s nominators wrote. “This is a lasting legacy for both Dr. Oliver and vascular biology that is in the true spirit of the Benditt Award.”

Oliver is scheduled to formally receive the award October 24 at the Vascular Biology 2021 conference.

Welcome New Faculty

Marcelo G. Bonini, PhD, joins as professor of Medicine in the Division of Hematology and Oncology and interim associate director for education and training at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. Bonini earned his PhD from the University of Sao Paulo’s Department of Biochemistry, and then joined the laboratory of Ronald Mason, PhD, at the National Institute of Environmental Health Sciences for postdoctoral training focused on pharmacology, toxicology and signal transduction effected by biological oxidations. In 2009, he was appointed assistant professor of Medicine and Pharmacology at the University of Illinois, Chicago, where he was promoted to associate professor in 2015. In 2018, he joined the Medical College of Wisconsin, Milwaukee, as a professor of Medicine and Biophysics and the founding director of the Innate Immunity Program. He was there for two years before joining Northwestern. His laboratory is interested in understanding how changes in the electrochemical microenvironments change organelle performance and gene expression patterns associated with inflammation and cancer.

Graduate Student/Post-Doc Events and Opportunities

ResilientNU Spring Cohorts

Prioritize yourself this spring and join a ResilientNU cohort. Once a week for five weeks, you will join a virtual small group where you can explore topics like balance, mental health and mindfulness. Groups are co-facilitated by a Northwestern student and a Health Promotion and Wellness staff member. For more information, check out the interest form.

Contact: ResilientNU, resilientnu@u.northwestern.edu

Leverage Personal Strengths for Long Term Results With Wellness Coaching

Wellness Coaching helps you identify and achieve your wellness goals, balance dimensions of wellness and learn practical skills to improve overall well-being.

Coaches can address goals related to physical activity, sleep, healthy eating, time management and stress management/ coping skills

Learn more and register here.

Contact: Health Promotion and Wellness, hpaw@northwestern.edu

Sunday Mass via YouTube

Sunday, March 28, April 4, 11, 18, 25

Join the Sheil Catholic Center community for mass every Sunday during the pandemic. Each Sunday, the mass is posted to the YouTube channel, available on-demand.

Contact: Teresa Corcoran, sheil@u.northwestern.edu

Tax Workshop

Monday, April 5

Time: 6:00 p.m. to 8:00 p.m. CST

Online via Zoom (Meeting ID: 910 7085 1048; Dial in at 312-626-6799)

With taxes due on April 15, join the Office of International Student and Scholar Services for a tax workshop.

Contact: Taya Carothers, taya.carothers@northwestern.edu

More information

Research in the News

***Fox News,* February 9**
Many first report peanut allergy symptoms in adulthood, study finds
Ruchi Gupta, MD, was featured.
- This research was also featured in *Yahoo! News*.

***The New York Times*, February 10**
'A Game Changer': Drug Brings Weight Loss in Patients With Obesity
Robert Kushner, MD, was featured.
- This research was also featured in *U.S. News & World Report, CNN, Chicago Tribune, WebMD, HealthDay and others.*

***U.S. News & World Report*, February 17**
Insight Into Why a Prostate Cancer Therapy Works Better for Black Men
Edward Schaeffer, MD, PhD, and Adam Weiner, MD, were featured.
- This research was also featured in *HealthDay.*

***Chicago Tribune,* February 17**
A mother's heart health during pregnancy can affect her kids' health, study finds
Amanda Perak, MD, MS, was featured.

This research was also featured in *U.S. News & World Report* and *HealthDay.*

***NBC 5 Chicago*, February 18**
Imaging Reveals How COVID Can 'Cause the Body to Attack Itself,' Study Shows
Swati Deshmukh, MD, was featured.
- This research was also featured on *Fox 32 Chicago*.

***The New York Times*, February 18**
Clinical Trials Are Moving Out of the Lab and Into People's Homes
Mary McDermott, MD, was featured.

***Crain's Chicago Business,* February 19**
Illinois struggles to keep track of new coronavirus variants
Egon Ozer, MD, PhD, was featured.

***WebMD,* February 23**
Why Some 'Super Ager' Folks Keep Minds Dementia-Free
Tamar Gefen, PhD, was featured.

More media coverage >>

Tackling the Spread and Impact of Infectious Diseases and Viral Infections

Michael Ison, MD, MS, professor of Medicine in the Division of Infectious Diseases and of Surgery in the Division of Organ Transplantation

Michael Ison, MD, MS, a professor of Medicine in the Division of Infectious Diseases and of Surgery in the Division of Organ Transplantation. He is also director of the Northwestern University Clinical and Translational Sciences Institute's Center for Clinical Research.

His clinical and research interests focus on infections in transplant recipients, as well as viral infections including norovirus, cytomegalovirus and respiratory viral infections (influenza and adenovirus) in this patient population. He is also involved in collaborative research efforts aimed to identify variants of the SARS-CoV-2 virus as they emerge in Chicago and in helping to develop biobanks of specimens from patients with COVID-19.

Ison is also a member of the Northwestern University Transplant Outcomes Research Collaboration (NUTORC) and the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

Q&A

What are your research interests?
My research focuses on two major areas of infections. My primary research focus is on respiratory viral infections in hospitalized and immunocompromised adults. Historically this has focused on influenza but has expanded to include RSV and COVID-19 more recently. We have worked diligently to develop and implement antiviral drugs to prevent and treat influenza and other respiratory viral infections. Through this work, we have demonstrated that oseltamivir is safe and effective for the prevention of influenza in immunocompromised patients and I have led key studies that led to licensure of peramivir and baloxavir for influenza. My second area of research is on post-transplant infections. We currently are leading a large multi-center study to identify the natural history and optimal treatment of norovirus in transplant patients, a debilitating and chronic disease in these patients.

What is the ultimate goal of your research?
My goal is to develop antiviral strategies for the prevention and treatment of a range of respiratory and non-respiratory viruses affecting hospitalized and immunocompromised adults. Unfortunately, as we have seen this past year, new pathogens remain a persistent threat to the health of mankind. Lessons gleaned from our ongoing work have informed our approach to research (the NUCATS-funded COVID-19 Biobank and Lurie Cancer Center-funded COVID-19 Convalescent Biobank); have provided tools for our ongoing research (I was part of the interagency working group that developed the Ordinal Scale being used for most COVID-19 hospitalized studies); and inform approaches to improve outcomes of infection. Likewise, antimicrobial resistance is a persistent threat in infectious diseases and impacts the success of antiviral drugs. Developing therapies that can be applied in ways to prevent resistance emergence while maintaining clinical efficacy is the ultimate goal of any infectious diseases research.

How did you become interested in this area of research?
I think mentors are critically important to interest in research. When I met with faculty at the University of Virginia to investigate potential research projects, my eventual mentor Fred Hayden proposed a series of studies using an immunocompromised mouse model of influenza and a series of clinical studies in humans. He set me up with two amazing collaborators: Larisa Gubareva, who is one of the world's experts on influenza antiviral resistance and now the lead of Molecular Epidemiology at the CDC's Influenza Division, and Tom Braciale, who was the director of the Carter Immunology Center at the University of Virginia.

These mentors introduced me and facilitated my excitement about influenza and its unique impact on immunocompromised patients. They also connected me with the National Institute of Allergy and Infectious Diseases Collaborative Antiviral Study Group, where I learned how to collaborate with others to design multi-center clinical trials of antivirals for respiratory infections. I followed this interest to Massachusetts General Hospital where I worked with Jay Fishman during my Transplant Infectious Diseases Fellowship. We conducted the first study of the impact of oseltamivir on lung transplant recipients. Clinically, Jay also sparked my interest in viral infections outside the lung, as well. As the result of a unique case during my year in Boston, we established the U.S. Organ Vigilance System (OPTN Disease Transmission Advisory Committee), which helped focus my interest in donor-derived infections.

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Understanding the Labor Cascade

Ariel Dotts, student, Driskill Graduate Program in Life Sciences

Ariel Dotts, a fifth-year student in the Driskill Graduate Program in Life Sciences (DGP), studies the role of progesterone and estrogen in initiating labor in the laboratory of Serdar Bulun, MD, chair and the John J. Sciarra Professor of Obstetrics and Gynecology and interim chief of the Division of Reproductive Science in Medicine.

Q&A

Where is your hometown?
I'm from the South! My hometown is Charlotte, North Carolina.

What are your research interests?
My research interest is women's reproductive health. Specifically, I'm interested in bridging gaps in health disparities for women's reproductive health.

What exciting projects are you working on?
I am currently investigating the role of progesterone and estrogen receptors in the initiation of human labor to understand the processes that take place for the labor cascade. Hopefully this will lead to better therapeutics to prevent preterm labor.

What attracted you to your program?
As a young graduate student, I wasn't quite sure what field I was most interested in studying. The DGP allowed me to rotate through labs in different departments, broadening my experience and elucidating the field that piqued my interests!

What has been your best experience at Feinberg?
Research Day has been an exciting experience. To see the vast array of research performed at Feinberg was amazing, and sharing my own research with others in different fields was a great training opportunity for me as a student.

How would you describe the faculty at Feinberg?
From pharmacology courses to the introduction of clinical trials, the faculty are knowledgeable in their fields and really aim to help students master the topics themselves.

What do you do in your free time?
In my free time I love having Disney sing-a-longs with my three-year-old daughter!

What are your plans for after graduation?
After graduation I plan to embark on a career that allows me to bridge health disparity gaps in women's reproductive health, whether that be a post-doctoral fellowship at an academic institution or a position in the public sector.

Tracking Variants, Ison *(continued from page 5)*

How is your research funded?
My research is funded through a number of approaches. Our current norovirus project and our influenza vaccine studies are funded by the NIH, as have several prior projects. I have worked with a range of pharmaceutical companies to perform clinical trials, including several as the lead investigator that helped to design and implement large multi-national research studies. Some of my most interesting research has been funded by the hard work of summer students, residents and fellows. These projects significantly advanced our epidemiologic understanding of critical infections such as norovirus, influenza, respiratory syncytial virus and parainfluenza virus. This data has been used by the interagency working group on endpoints of influenza antiviral studies and to inform NIH-funded studies.

Where has your work been published?
The past year has resulted in several high-impact publications. The CAPSTONE-2 study that expanded the indication of baloxvir was recently published in *Lancet Infectious Diseases*. A summary of 10 years of experience with the organ vigilance system was published in *American Journal of Transplantation.* We also published a five-year experience on what we've learned about optimal screening of candidates and recipients of lung transplant to prevent development of Ureaplasma-associated hyperammonemia syndrome in *Clinical Infectious Diseases.*

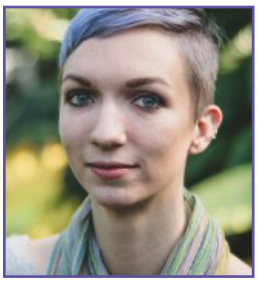
We've also had great team science published this year related to COVID-19 clades in Chicago in *EBioMedicine*.

What types of collaborations are you engaged in across campus (and beyond)?
I love collaborative research — it's always more fun to do research with a group than by yourself. Perhaps one of the most exciting times for me at Northwestern was when Daniela Ladner joined the transplant group and established NUTORC. This brought together clinical and non-clinical researchers to solve problems relevant to transplant. The initial presentations were incredibly exciting and engaging and led to a number of projects, including a NIH-funded study to optimize education about donor risk.

Due to ongoing work on COVID-19, I've had the chance to interact with a superstar group in Infectious Diseases (Judd Hultquist, Lacy Simons, Ramon Lorenzo-Redondo and Egon Ozer) who have led efforts to identify variants as they emerge in Chicago and truly made the COVID-19 Biobank happen. I have also worked with researchers in nephrology, cardiology and immunology to understand the impact of COVID-19 on humoral response and outcomes of COVID-19. I was also lucky to be asked to lead the NUCATS Center for Clinical Research, which has resulted in a significant expansion of collaborations across campus.

Unlocking the Genome

Laura Shihadah, core technician at the NUSeq Core Facility



Laura Shihadah, core technician at the NUSeq Core Facility, helps investigators unlock a wealth of information hidden in the genome. Over the last year, Shihadah has focused on single cell RNA sequencing, preparing and sequencing large libraries of valuable genetic data.

Q&A

Where are you originally from?
I lived near St. Paul, Minnesota until I was 8 years old, then spent the rest of my childhood in the small town of Washington, Illinois.

What is your educational background?
I studied animal science at at the University of Illinois at Urbana-Champaign, receiving my Bachelor of Science in 2014. I'm currently enrolled in a graduate program in conservation science through Oregon State University's online program. I'm very interested in conservation genetics and I'm aiming to pursue a master's degree with this focus.

Please tell us about your professional background.
After undergrad, I worked at the Illinois Natural History Survey performing entomology research on the effectiveness of genetically modified corn against western corn rootworm beetles. After that I worked as a research assistant at the Carl R. Woese Institute for Genomic Biology. There, I helped with a project studying photosynthesis in tobacco plants.

After moving to Chicago in 2016, I was an intern and then a temporary full-time aquarist at the Shedd Aquarium. I worked in the Special Exhibits team, mostly with the amphibians and jellyfish. I stayed on as a volunteer with the Amazon team at the aquarium and started working for the NUSeq Core Facility at Northwestern in 2018.

Why do you enjoy working at Northwestern?
Working at Northwestern has been a great experience. I'm proud to support research at such a prestigious university and of the amazing discoveries made here. It's also a very diverse and accepting work environment and I feel comfortable being myself here.

How do you help scientists and research students at the medical school?
At NUSeq Core, we assist many different labs with a wide range of projects. Most of our technicians do a little bit of everything. I do quality control of libraries, a variety of library preparation and sequencing on several instruments. Over the past year, I have been helping many researchers with their single cell RNA sequencing projects, processing their samples using 10x Genomics technology, preparing their libraries and then sequencing. We help scientists obtain crucial data for grants and publication.

What is your favorite part of the job?
My favorite part of this job would have to be the variety. The amount that I have learned since beginning my work here is massive! At any given time, I'm working on multiple projects of various types. Sometimes it's quite challenging, but I thrive when my brain is multitasking and constantly learning so this is a great place for me.

Another aspect of this work that I find valuable is the exposure to varied academia and industry. I'm meeting researchers from across many different disciplines and connect with industry representatives both as a necessary part of my everyday work and at work-related conferences. With so much learned and so many connections made across various fields, this position has been a very valuable experience — one I feel is unique to working at a core lab.

What exciting projects are you working on?
Recently, our lab has been involved in some ongoing COVID-19 research, which has been really new and interesting. This past spring, we had to very quickly set up new areas to process infectious samples, which was pretty unexpected and challenging, but I'm excited to see the publications that will come out of the projects myself and my coworkers are helping out.

What do you like to do in your spare time?
When I'm not working, I like to read, draw, travel, play video games and write fiction. I play piano, clarinet and bass guitar in an indie folk band. I also spend a lot of time training in the aerial circus arts, mostly trapeze and aerial hoop.

NIH News

Announcement of Childcare Costs for Ruth L. Kirschstein National Research Service Award (NRSA) Supported Individual Fellows

As part of ongoing efforts to develop programs that support family-friendly research environments for the NIH-supported workforce, the NIH will begin providing an option for NRSA fellows to request support for childcare costs effective April 8. The NRSA childcare costs apply to full-time NIH-NRSA supported fellowship positions. Each fellow is eligible to receive $2,500 per budget period to offset childcare costs. For households where both parents are NRSA fellows, each parent is eligible to receive $2,500.

NRSA fellows are encouraged to carefully review this Guide Notice and FAQ for more information. Additional guidance is anticipated for NRSA-supported trainees in Phase 2 of this initiative early fiscal year 2022.

Share Your Feedback: Inviting Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity and Inclusion in Biomedical Research and Advance Health Disparities and Health Equity Research

NIH Director Francis Collins, MD, PhD, recently issued a statement on NIH efforts to end structural racism and racial inequities in biomedical research through a new initiative called UNITE, which has begun to identify short-term and long-term actions. In alignment with these efforts, the NIH seeks public input on practical and effective ways to improve the racial and ethnic diversity and inclusivity of research environments and the biomedical research workforce across the United States. This request for information (RFI) will assist NIH in identifying, developing and implementing strategies that will allow the biomedical enterprise to benefit from a more diverse and inclusive research workforce and a more robust portfolio of research to better understand and address inequities in our existing system. While it will be important to understand further the fundamental and systemic barriers, the primary focus of this RFI is on the actions and solutions – through policy, procedure or practice – NIH should consider in order to promote positive culture and structural change through effective interventions, leading to greater inclusiveness and diversity. Feedback will be accepted via this online form through April 9, 11:59 p.m. EST.

RePORTER Matchmaker Tool

Matchmaker is an extension of NIH's RePORTER system that helps investigators find similar projects funded by NIH. The tool allows users to enter abstracts or other scientific text and Matchmaker will return lists of similar projects from RePORTER or program officials associated with those projects. Matches are based on the terms and concepts used in the submitted text. Matchmaker summarizes the projects by the program official, institute or center, review panel and activity code. Learn more about the Matchmaker tool from this short video.

NUCATS Corner

Clinical and Translational Sciences Institute

Enhanced Recruitment Toolkit Available

The NUCATS Institute's Center for Clinical Research continues to enhance its Recruitment Toolkit in an effort to provide Northwestern study teams with valuable resources and information.

The digital toolkit consists of essential training, templates, and editorial guidance to create recruitment materials and respond strategically to recruitment challenges. Visit the toolkit for recruitment information on:

- Public-facing recruitment portals
- Social media usage
- Research recruitment trackers
- Northwestern-specific resources
- CCR services
- Additional external resources

NUCATS also hosts daily drop-in sessions to aid research teams interested in The New Normal recruitment portal.

Consider attending a NUCATS drop-in session, held Monday through Friday from 9-10 a.m. (zoom passcode 824369). Center for Clinical Research Recruitment Operations Manager Tina Ward will answer your questions about TNN Match. If you are unable to attend, contact Tina Ward to schedule a TNN informational session.

EQuaTR Conference 2021

The 2021 Enhancing Quality in the Translational Research Workforce (EQuaTR) Conference has gone virtual in light of the evolving COVID-19 pandemic. The Institute for Translational Medicine, the Northwestern University Clinical and Translational Sciences Institute and the University of Illinois at Chicago Center for Clinical and Translational Science are very enthusiastic about hosting this virtual event over a four-week period beginning in May. The dates for this event are listed below:

- Thursday, May 13, 2021, 11:00 a.m. - 1:15 p.m.
- Thursdays, May 20, 27; June 3, 2021, 10:00 a.m. - 12:15 p.m.

Please visit the EQuaTR Conference website for registration information.

Sponsored Research

PI: Booki Min, PhD, professor of Microbiology-Immunology

Sponsor: National Institute of Allergy and Infectious Diseases

Title: Foxp3+ regulatory T cell-dependent treatment of allergic inflammation by glucocorticoids

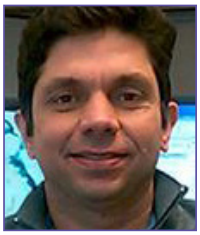
Asthma is a chronic inflammatory disease of the airways, affecting more than 25 million Americans. The annual economic cost for asthma exceeds $50 billion, making asthma one of the most common and costly diseases. Allergen-specific Th2 type CD4 T cell activation and eosinophil infiltration are hallmarks of asthmatic inflammation. Oral or inhaled glucocorticoids have been the frontline treatment to effectively manage asthma for more than 50 years. Some patients develop a condition refractory to glucocorticoids, known as steroid resistance. Steroid resistance is difficult to treat and associated with severe and fatal diseases, requiring high dose steroid treatments to achieve minimal control. However, prolonged use of high dose steroids is not recommended due to detrimental side effects. Therefore, identifying a new strategy to reverse steroid-resistant inflammation is a subject of utmost importance.

The current study is built upon unexpected observations that synthetic glucocorticoid, dexamethasone, fails to dampen eosinophilic airway inflammation in the absence of Foxp3+ Tregs, a CD4 T cell subset that plays a central role in regulating immunity and tolerance. Adoptive Treg transfer into this condition restores dexamethasone treatment effects, supporting the role of Tregs. We also found that steroid-resistant airway inflammation model is attenuated upon treating with dexamethasone combined with IL-27, a cytokine essential for Treg suppressive functions. Dexamethasone/IL-27-mediated treatment of neutrophilic inflammation also failed in Treg-depleted or in Treg-specific Il27ra-/- mice, suggesting the key roles of Tregs and of IL-27 signaling in Tregs. These preliminary results have led us to propose that dexamethasone signaling induces Treg suppressive functions that limit eosinophilic inflammatory responses, whereas control of neutrophilic inflammatory responses by dexamethasone requires additional signals conferred by IL-27 to the Tregs.

Utilizing murine models of steroid-responsive and -resistant airway inflammation models and genome-wide gene expression analysis, we aim to investigate the roles of Tregs during steroid treatment of inflammation and the molecular mechanisms by which steroids program Tregs for better suppressive functions. Successful completion of the study may open opportunities to develop novel approaches to improve therapeutic efficacy of steroids as well as to overcome steroid resistance by targeting Tregs.

Read more

PI: Rajeshwar Awatramani, PhD, professor of Neurology in the Division of Movement Disorders



Sponsor: National Institute of Neurological Disorders and Stroke

Title: Developmental underpinnings of substantia nigra vulnerability

DA neuron degeneration, resulting in deficient DA signaling, underpins the debilitating motor symptoms of Parkinson's disease. Among DA neurons, those located in ventral tier of the substantia nigra pars compacta (SNc) are particularly vulnerable compared to those in the dorsal tier of the SNc or ventral tegmental area (VTA). A mechanistic explanation of selective DA neuron vulnerability remains an important goal, which has been hampered in part by a lack of understanding of the intrinsic differences between DA neurons.

We hypothesize that even within a single neuroanatomical cluster like the SNc there exist DA subtypes with distinct developmental histories and intrinsic properties that may influence their vulnerability. Single-cell-expression-profiling-based DA neuron classification from our lab revealed the presence of a key SNc population defined by Sox6 and Aldh1a1. This subtype was located in the ventral tier of the SNc, and was preferentially vulnerable in a toxin model of PD. Our preliminary data indicate that this population exists in human SNc, and is also selectively vulnerable in post-mortem PD samples. To interrogate the basis for selective vulnerability in the SNc in depth, we then developed a set of intersectional genetic strategies, which strikingly defined a fault-line in the SNc defined by Sox6 expression, with Sox6+ cells being located ventrally and Sox6- cells forming the dorsal tier.

Building on these studies, several key questions remain unanswered. Are dorsal and ventral SNc subtypes developmentally distinct? Do these neurons have different anatomical features and DA release characteristics? Is the size of arborizations of these neurons, a property linked to vulnerability, different? Are calcium fluxes and mitochondrial bioenergetic properties distinct? We aim to answer these questions.

Read more

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."

Funding

Crazy 8 Initiative Award

More information

Sponsor: Alex's Lemonade Stand Foundation for Childhood Cancer
Letter of Intent Due : April 26
Application Deadline: August 5, by invitation only
Upper Amount: $5M

Synopsis: This award will fund research into innovative and rigorous approaches that directly address the most intractable issues in pediatric cancer research today. This award is designed to coalesce cross-disciplinary cores of scientists working collaboratively in order to accelerate the pace of new cure discovery.

The proposal should address a topic that is responsive to at least one of these four pediatric cancer research themes: 1.) developmental origins of pediatric cancers; 2.) drugging currently undruggable pediatric cancer drivers; 3.) developing novel immunotherapies; and 4.) discovery and development of novel pediatric cancer drug targets.

It is expected that successful applications will address one or more of the eight disciplines that formed the basis of the Crazy 8 initiative (embryonal brain cancers, high-grade gliomas, fusion-positive sarcomas, fusion-negative sarcomas, leukemias, neuroblastoma, big data and catalyzing clinical trials).

Research Grant on Disparities in Lung Cancer

More information

Sponsor: Lung Cancer Research Foundation
Letter of Intent Due: April 30
Amount: $150K over two years

Synopsis: While scientific advances steadily continue to reduce lung cancer incidence and deaths, disproportionately affecting various groups such as African Americans, Native Americans, low socioeconomic status populations and people from certain geographic locations.

Despite progress to reduce the burden of tobacco, disparities in tobacco-related morbidity and mortality remain, and inequitable receipt of evidence-based lung cancer care continues to compound these disparities.

The Lung Cancer Research Foundation encourages applications on a wide variety of disparities-related topics such as:

- Gender disparities in lung cancer burden
- Causes and risk factors for lung cancer among never smokers
- Influence of social and biological risk factors on lung cancer outcomes, access to and use of care and quality of care
- Genetic and gene-environment interactions
- Interactions and contributions of multiple factors (e.g., smoking, genetics, environment, societal factors) to disparities in lung cancer outcomes
- Contribution of healthcare access and quality to disparities in outcomes
- Disparities related to other factors such as geography, socioeconomic status and age

Triadic Interactions in Clinical Encounters Involving People With Alzheimer's Disease and Alzheimer's Disease-Related Dementias, Clinicians and Care Partners (R01 Clinical Trial Optional)

More information

Sponsor: National Institute on Aging (NIA)
Letter of Intent Due: May 23
Application Deadline: June 23
Upper Amount: $500k

Synopsis: The NIA seeks applications focused on triadic interactions and interpersonal processes between individuals with Alzheimer's disease or Alzheimer's disease-related dementias (AD/ADRD), clinicians and care partners to increase understanding of the impact of such interactions on patient health and wellbeing outcomes.

The goal of this initiative is to identify targets for the development of behavioral interventions to optimize interactions in clinical settings and help build and preserve strong and supportive caregiving relationships throughout all stages of AD/ADRD and across the continuum of care.

Applications should propose basic research and stage I behavioral intervention development clinical trials in two high-priority areas: (1) triadic communication and interpersonal relationships between patients, clinicians and care partners; and (2) the clinical significance of dyadic processes in caregiving relationships between patients and care partners in the context of patient-caregiver-clinician encounters.

View COVID-19 funding opportunities

View more funding opportunities

Beyond PubMed: Enhancing Your Literature Search with Multiple Databases

By Annie Wescott, Research Librarian

Searching a variety of databases is the trademark of any comprehensive review. While PubMed is an excellent place to start, it will never give us the full plot of the information landscape on a single topic. This is especially critical when it comes to systematic and scoping reviews, which aim to reduce bias through comprehensive searching across multiple databases. All said, different databases serve different needs or focus areas. It is useful to know what each database covers, their modes of searching and when might be the best time to utilize a specific database or skip it in favor of another option.

Google Scholar

Google Scholar is a go-to for many researchers because of its ease of use and familiarity. It includes a wide range of scholarly citations across various disciplines. Although Google Scholar benefits from the breadth of topic areas it covers, it can be difficult to pin down the scope of its coverage. Unlike most databases, Google Scholar does not index specific journals. Instead, the database relies on a bot to "crawl the web" for available articles.

When is it most useful?

The availability of articles may differ from one day to the next based on firewalls or other permissions that allow these web-crawling bots access to specific websites. This makes Google Scholar a great choice for background searching at the beginning of the review process but a less desirable choice when comprehension and reproducibility are the goals.

APA PsycINFO

APA PsycINFO is an abstract database focusing on scholarly content in the field of psychology from the early 1800s to the present. PsycINFO also hosts interdisciplinary coverage of literature in the behavioral and social sciences. It indexes journals, books, dissertations, videos and other related material. Searchers can benefit from PsycINFO's thesaurus of controlled vocabulary to identify preferred and related terms for topic searches.

When is it most useful?

PsycINFO is best for topics focused on psychology and the behavioral and social sciences. It is also a valuable resource when you have a research question that addresses interdisciplinary topics (e.g. patient adherence to a specific therapy).

CINAHL Plus with Full Text

CINAHL Plus covers literature in the nursing and allied health professions. CINAHL can be a valuable resource for researchers in all fields due to the interdisciplinary nature of its contents, including coverage of the biomedical, nursing, complementary and alternative medicine and allied health fields. The database has coverage going back to 1937, with 5,600 indexed journals (340 of which provide full-text content). The database also has its own controlled vocabulary, which helps researchers search for indexed concepts to easily locate related resources.

When is it most useful?

CINAHL is ideal when researching topics related to nursing, allied health disciplines or alternative/complementary medicine. It is also useful if you want resources outside the typical journal article format as it includes books, book chapters and dissertations.

Cochrane Library

Cochrane Library is a highly respected suite of multiple databases with a focus on resources for clinical decision-making. Cochrane Library includes three main coverage areas:

Cochrane Database of Systematic Reviews (CDSR)

The CDSR is a leading resource for health-related systematic reviews and protocols. The database includes reviews developed and implemented by the Cochrane Review Groups. Each review follows strict Cochrane guidelines and undergoes peer review.

Cochrane Central Register of Controlled Trials (CENTRAL)

The CENTRAL database is a composite of registered controlled trials from various other databases and registries (e.g. PubMed, Embase, ClinicalTrials.gov and WHO's International Clinical Trials Registry Platform), as well as unique content uploaded by the Cochrane Review Groups based on handsearching.

Cochrane Clinical Answers

Clinical Answers aims to synthesize information of the Cochrane Reviews and make them easily available for use in clinical care settings.

When is it most useful?

Cochrane Library is great for locating data or reviews on specific clinical or research questions because the topics are often highly specific. It is almost always searched when conducting a systematic review and is known for its high-quality content.

Reference Links:

Google Scholar

APA

Ebsco

Cochrane Library

High-Impact Factor Research

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(continued on next page)

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Featured Core

Developmental Therapeutics Core

Northwestern's Developmental Therapeutics Core, under the Center for Developmental Therapeutics, facilitates preclinical development at the university, promoting basic and clinical cancer research with a focus on the development of new therapeutics and diagnostics. The core provides translation services to the Northwestern cancer research community with laboratory facilities, expertise with in vitro or in vivo tumor models (including mouse tumor models) as well as translational services to basic science investigators who lack expertise in tumor biology. The core also investigates novel therapeutic targets and approaches as well as animal tumor models to support the next generation of translation. The core provides investigators expertise in preclinical evaluation of new therapeutics (both in vitro and in vivo), access to animal models and laboratory facilities, and standard procedures and GLP-like documentation.

Fee-for-service tumor biology and translational support services include:

- Proliferation and apoptosis assays
- Therapy response experiments
- Exploratory pharmacokinetics and toxicology
- Device implantation and monitoring
- PDX models
- Immunization

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