

Northwestern Medicine



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FALL/WINTER 2023

MASTER OF MITOCHONDRIA

Research to understand how mitochondrial signaling contributes to disease earns
Feinberg investigator top honors. • p. 18

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Research Day 2023

Feinberg investigators, students, trainees, and faculty gathered to celebrate discovery and presented scientific research posters and abstracts at Feinberg's 17th annual Lewis Landsberg Research Day.

Photo by Nathan Mandell



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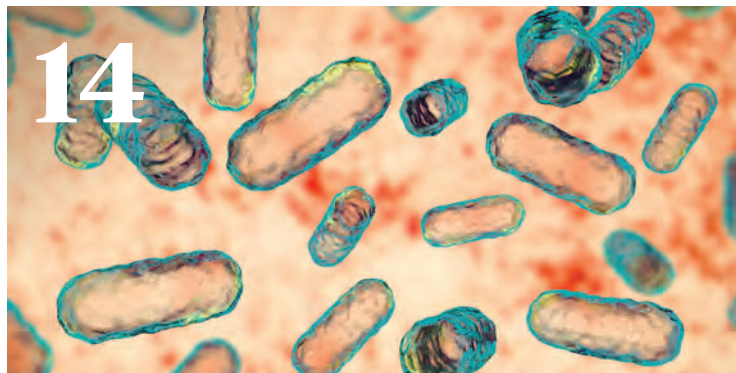
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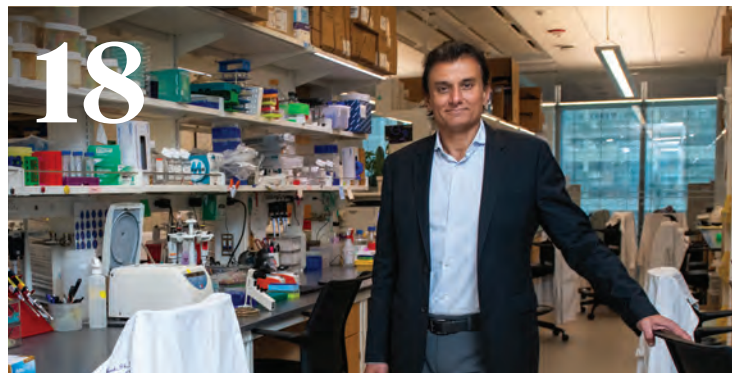
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Features



TRUSTING YOUR GUT

As mounting evidence points toward the critical role the gut microbiome plays in myriad disorders, Feinberg faculty study how the gut’s microbiome affects a wide range of conditions.



MASTER OF MITOCHONDRIA

Navdeep Chandel, PhD, received the prestigious Lurie Prize in Biomedical Sciences for his research revealing how mitochondrial signaling contributes to health and disease.



PAVING THE ROAD TO GAME-CHANGING WEIGHT LOSS IN AMERICA

Robert Kushner, MD, helped show the effectiveness of new anti-obesity medications that also help reduce cardiovascular disease risk.



KEEPING AN EYE OUT FOR THE COMMUNITY

Northwestern physicians provide affordable eye care through collaborations with community clinics.

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LEADERSHIP

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ON THE COVER
 Navdeep Chandel, PhD, the David W. Cugell, MD, Professor and professor of Medicine in the Division of Pulmonary and Critical Care and of Biochemistry and Molecular Genetics, has been honored with the esteemed Lurie Prize in Biomedical Sciences for his contributions to the field of mitochondrial science.

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Reaching New Heights



T HIS YEAR, FOR THE FIRST TIME, NORTHWESTERN UNIVERSITY TOPPED \$1 BILLION IN RESEARCH

funding, with Feinberg scientists securing \$706 million, a nearly nine percent increase over the prior year and the largest amount in our school's history.

This achievement is something everyone associated with Northwestern Medicine can take pride in. It represents the collective effort of every faculty member on our campus who brings ideas from the bench to the bedside to the community, and every trainee who seeks answers to pressing problems. It includes every alumnus and donor who funds a creative spark, every person and

“Reaching new heights in research funding suggests we are succeeding in this prestigious and competitive environment.”

team working diligently in a lab to conduct experiments, or in the clinic to save lives, and every staff member dedicated to research, education, and the transformation of human health. I am grateful for and inspired by this interconnected network of passionate and driven individuals.

So much of this work is enabled by the more than 349,000 research participants enrolled in clinical trials and research studies at Feinberg — a 44 percent increase in total active study participants since FY20. Without this group generously giving their time and their willingness to receive new treatments, translating funding and ideas into proven therapies and shared knowledge would not be possible.

In this issue, I am delighted to share stories about projects that represent our basic, clinical, and translational scientific aspirations. In “Paving the Road to Game-Changing Weight Loss in America” (page 20), our investigators worked with research participants from around the country to gain insight into how new anti-obesity therapies can improve overall health, and potentially transform primary care for people who are obese.

In “Master of Mitochondria” (page 18), we share the life's work of a faculty member who has spent decades studying the impact of mitochondria on health and disease — reviving a field of research while mentoring numerous trainees along the way. His work recently earned him the prestigious Lurie Prize in Biomedical Sciences by the Foundation for the National Institutes for Health.

“Trusting Your Gut” (page 14), brings us to an emerging and fast-growing area of scientific inquiry. Teams across the enterprise are making compelling discoveries leveraging the gut microbiome to improve health outcomes, from improving diagnostics to understanding the molecular underpinnings of a wide spectrum of disease.

Biomedical discovery, whether in nascent areas of inquiry or in fields of research long overdue for a breakthrough, is fueled by vigorous effort in precisely the right environment. It requires plenty of funding and steadfast sponsors undaunted by localized setbacks. It takes the right mix of people thinking, creating, volunteering, testing, and analyzing. Scale is important, as is partnering with innovative and diverse affiliates.

Reaching new heights in research funding suggests we are succeeding in this prestigious and competitive environment. Now it's up to us to deliver on that promise. What we do here and how we improve human health will ultimately determine our lasting legacy.

With warm regards,

Eric G. Neilson MD

Vice President for Medical Affairs
Lewis Landsberg Dean
Northwestern University Feinberg School of Medicine

Research Day 2023 Celebrates Scientific Discoveries and Collaboration

Feinberg investigators, students, trainees, and faculty gathered to celebrate discovery and present scientific research posters and abstracts at Feinberg's 17th annual Lewis Landsberg Research Day on September 14.

Rex Chisholm, PhD, vice dean for Scientific Affairs and Graduate Education, welcomed attendees to the celebration and presented the Medical Faculty Council Mentors of the Year and Tripartite Legacy Faculty Prize in Translational Science and Education awards to three Feinberg faculty members.

"Research Day is one of the highlights of the scientific year on the Feinberg calendar, and it's a great opportunity for us all to share the fantastic science that we're all participating in and an opportunity to form new collaborations," Chisholm says.

The keynote address was delivered by Craig B. Thompson, MD, former president and chief executive officer of Memorial Sloan Kettering Cancer Center from 2010 to September 2022. Thompson continues to oversee the Craig Thompson Lab at Sloan Kettering, which studies cellular metabolism and its role in disease and cancer.

"There's nothing more exciting than using a team-work-based approach to see if what can be broken can actually be corrected using modern drug discovery and clinical trial science, and the ultimate goal is to get ahead of disease and prevent it."

CRAIG B. THOMPSON, MD

Following the keynote, attendees explored more than 460 research poster presentations held across campus at the Louis A. Simpson and Kimberly K. Querrey Biomedical Research Center, the Robert H. Lurie Medical Research Center, and the Northwestern Memorial Hospital Feinberg Pavilion.

The Tripartite Legacy Faculty Prize in Translational Science and Education was awarded to David Cella, PhD, professor of Medical Social Sciences. Medical Faculty Council Mentors of the Year included Judith Moskowitz, PhD, MPH, professor of Medical Social Sciences, and Daniela Ladner, MD, MPH, the John Benjamin Murphy Professor and vice chair of research and innovation in the Department of Surgery.

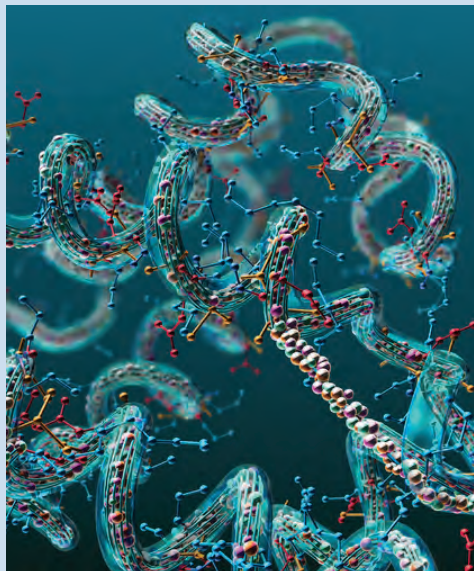


Top: Poster winners were recognized at an award ceremony. Bottom: Craig B. Thompson, MD. Photos by Nathan Mandell.

RESEARCH BRIEFS

SCIENTIFIC ADVANCES

PIONEERING NEW METHODS TO UNDERSTAND PROTEIN FOLDING



Northwestern Medicine scientists have developed a new technique for measuring protein folding stability on an unprecedented scale.

While advances in technology have helped scientists discover new protein sequences and folded structures, the overall stability of these folded structures is still largely a mystery and new methods are needed to reveal these folding behaviors.

Better understanding of protein folding may provide insight into disease development and protein evolution, as well as guide future approaches to protein engineering and drug development, says Gabriel Rocklin, PhD, assistant professor of Pharmacology and senior author of the study which was published in *Nature*.

“What’s significant about our paper is that we can use this approach to measure folding stability for practically a million different sequences in each experiment,” Rocklin says. “Measuring stability at that scale has always been impossible and a big bottleneck for research. Until recently, the main way scientists measure protein stability is purifying one protein at a time and doing an experiment on that one protein. With individual measurements like this, it’s hard to make predictions about stability for new sequences. By measuring stability on this much larger scale, our data can be used to develop machine learning tools to predict stability and design higher stability proteins.”

This work was supported by Northwestern University, the Robert H. Lurie Cancer Center of Northwestern University, the MD Anderson Cancer Center, and a grant from the Mark Foundation for Cancer Research.

CLINICAL BREAKTHROUGHS

Not Enough Women Receive Counseling on Heart Health Postpartum



Despite having risk factors for heart disease, only 60 percent of women reported receiving counseling on optimizing their heart health, which includes healthy eating, exercise, and losing weight gained during pregnancy at their six-week postpartum visit, a Northwestern Medicine study conducted between 2016 and 2020 and published in *JAMA* has found.

About 90 percent of women in the U.S. attend at least one postpartum visit during what is commonly referred to as the “fourth trimester.” For these women who are already juggling other demands — such as adjusting to life with a new child and returning to work — this visit is considered one of the few times during the first year after pregnancy to prioritize their own health, the study authors say.

“We need to find ways to take advantage of this prime opportunity when we have a captive audience of people who are already in the doctor’s office, talking about their health at a critical juncture in life,” says corresponding author Sadiya Khan, ‘09 MD, ‘14 MSc, ‘10, ‘12 GME, the Magerstadt Professor of Cardiovascular Epidemiology. “It is hard to create new opportunities. The fourth-trimester visit is an already-ready moment to prioritize maternal heart health.”

The study is the first to describe contemporary rates of heart-health counseling during postpartum visits for women with heart disease risk factors or who experienced pregnancy complications.

Funding for the study was provided by the National Heart, Lung and Blood Institute of the National Institutes of Health grant R01HL161514-02.



ABOUT 90 PERCENT OF WOMEN IN THE U.S. ATTEND AT LEAST ONE POSTPARTUM VISIT DURING WHAT IS COMMONLY REFERRED TO AS THE “FOURTH TRIMESTER.”



DISEASE DISCOVERIES

New Therapeutic Target for Parkinson's Disease Discovered



Northwestern Medicine scientists have uncovered a new mechanism by which mutations in a gene, *parkin*, contribute to familial forms of Parkinson's disease. The discovery opens a new avenue for Parkinson's therapeutics, scientists report in a study published in *Science Advances*.

The Northwestern scientists discovered that mutations in *parkin* result in a breakdown of contacts between two key workers in the cell – lysosomes

THE NORTHWESTERN SCIENTISTS DISCOVERED THAT MUTATIONS IN *PARKIN* RESULT IN A BREAKDOWN OF CONTACTS BETWEEN TWO KEY WORKERS IN THE CELL – LYSOSOMES AND MITOCHONDRIA.

and mitochondria. Mitochondria are the main producers of energy in cells, and lysosomes recycle cellular debris that accumulates during normal function of

our cells. These organelles are especially important in our brains because neurons are highly dependent on energy production by mitochondria, and because of their activity, neurons produce an abundance of cellular debris that must be cleared by lysosomes.

In a prior study, published in *Nature*, Dimitri Krainc, MD, the chair and Aaron Montgomery Ward Professor of Neurology, and his group discovered that lysosomes and mitochondria form contacts with each other. In the new study, investigators report that lysosomes help mitochondria by providing key metabolites for their function. Mitochondria must import many of their essential ingredients, but it is not known where some of these metabolites come from. On the other hand, lysosomes serve as recycling factories in cells and, therefore, produce many breakdown products that could be used by other organelles such as mitochondria.

The study was supported by the following National Institutes on Aging grant AG066333, National Institute of Neurological Disorders and Stroke grants NS109252 and NS122257, all from the National Institutes of Health.

CLINICAL BREAKTHROUGHS

FIRST DEVICE TO MONITOR TRANSPLANTED ORGANS, DETECT EARLY SIGNS OF REJECTION



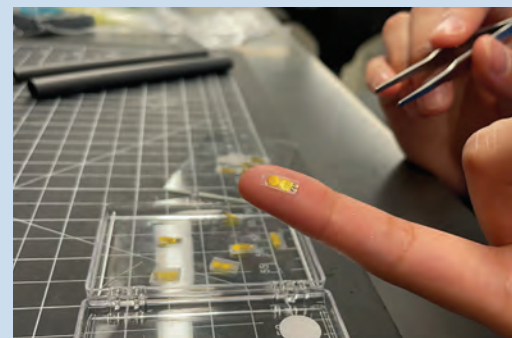
Northwestern scientists have developed the first electronic device for continuously monitoring the health of transplanted organs in real time.

Sitting directly on a transplanted kidney, the ultra-thin, soft implant can detect temperature irregularities associated with inflammation and other body responses that arise with transplant rejection. Then, it alerts the patient or physician by wirelessly streaming data to a nearby smartphone or tablet.

In a study published in *Science*, the investigators tested the device on a small animal model with transplanted kidneys and found the device detected warning signs of rejection up to three weeks earlier than current monitoring methods. This extra time could enable physicians to intervene sooner, improving patient outcomes and wellbeing as well as increasing the odds of preserving donated organs, which are increasingly precious due to rising demand amid an organ-shortage crisis.

The clinical portion of the study was led by Lorenzo Gallon, MD, professor of Medicine in the Division of Nephrology and Hypertension and a Northwestern Medicine transplant nephrologist. Device development was led by John Rogers, PhD, the Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering, Biomedical Engineering, and Neurological Surgery.

The study was supported by the National Science Foundation and an Alpha Omega Alpha Carolyn L. Kuckein Student Research Fellowship.



DISEASE DISCOVERIES



STUDY DISCOVERS NOVEL THERAPEUTIC TARGET FOR ACUTE RESPIRATORY DISTRESS SYNDROME



Despite advancements in the understanding of acute respiratory distress syndrome (ARDS), there are no targeted therapies currently available for patients, and the

mortality rate remains high — approximately 40 percent.

The disease occurs when fluid leaks into the lungs, depriving the lungs of oxygen entering the bloodstream. ARDS is commonly the result of injury to the lungs, but aging is also a major risk factor and increases the risk of mortality.

A new Northwestern Medicine study has discovered a novel therapeutic target and therapeutic agents for older patients with ARDS.

“Compared to young adults, the incidence of ARDS resulting from sepsis, pneumonia, and COVID-19 in the elderly is as much as 20-fold greater and mortality is up to 10-fold greater,” says YouYang Zhao, PhD, the William G. Swartchild Jr. Distinguished Research Professor of Pediatrics in the Division of Critical Care and senior author of the study.

Using genetic lineage tracing in both aged and young mouse models of ARDS, Zhao’s team found that persistent lung injury and high mortality after sepsis due to ARDS were caused by impaired regeneration of endothelial cells in the lungs — cells that line blood vessels in the lungs to regulate the exchange of oxygen between the bloodstream and surrounding tissue — and lung repair.

Specifically, the expression of the gene *FOXM1*, a previously known mediator of endothelial cell regeneration, was impaired in the lungs of aged mice but not in younger mice. The study was published in *Science Translational Medicine*.

This work was supported in part by National Institutes of Health grants R01HL123957, R01HL125350, R01HL133951, R01HL140409, R01HL146810, R01HL162299, R01HL164014 and RO0HL145113.

DISEASE DISCOVERIES

Novel Intercellular Signaling Mechanisms Promote Melanoma Growth



More than 90,000 cases of melanoma, the most aggressive type of skin cancer, will be diagnosed

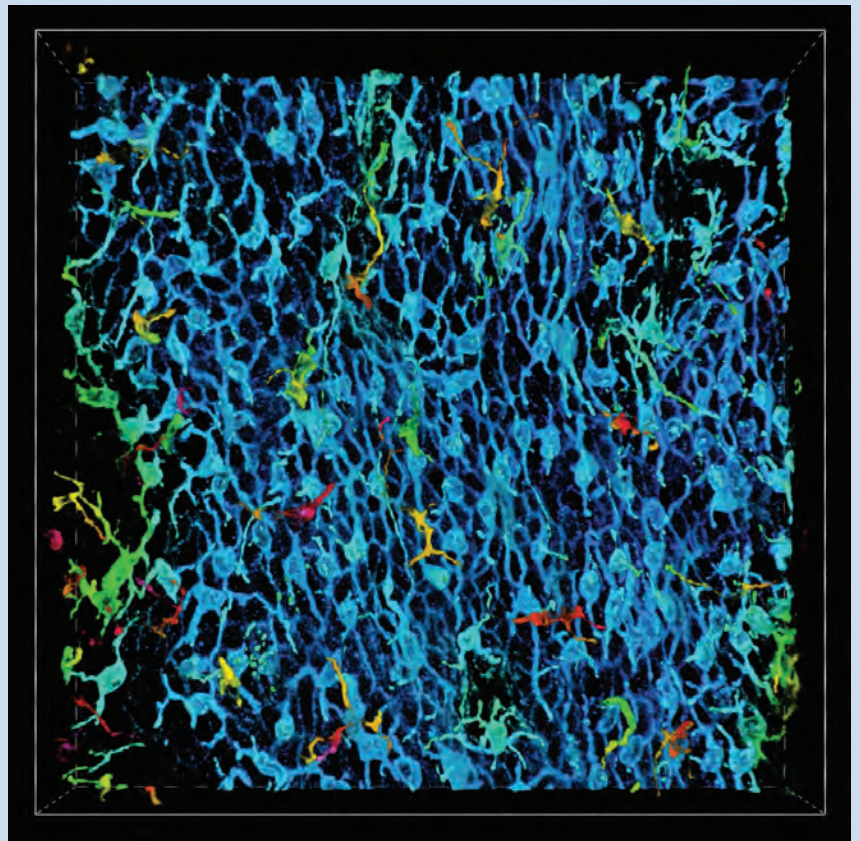
this year alone, according to annual estimates from the American Cancer Society. Investigators led by Kathleen Green, PhD, the Joseph L. Mayberry, Sr., Professor of Pathology and Toxicology, have discovered novel intercellular “crosstalk” between epidermal keratinocytes and melanoma cells that promote cancer growth and metastasis.

Using RNA sequencing and immunofluorescence microscopy to

study patient samples of melanoma cells, the investigators identified a melanocyte-keratinocyte communication loop between the two cell types, which help the melanocytes changing into melanoma cells become more aggressive.

These signaling mechanisms could also serve as biomarkers for early cancer detection, according to the study, which was published in the *Journal of Cell Biology*.

This work was supported by National Cancer Institute grants T32 CA009560 and R01 CA228196, National Institute of Arthritis and Musculoskeletal and Skin Diseases grants R01 ARO41836 and R01 ARO43380, and the J.L. Mayberry Endowment.



SCIENTIFIC ADVANCES

UNDERSTANDING DRIVERS OF EGG CELL DEVELOPMENT



Northwestern Medicine scientists have identified how cytoskeletal proteins contribute to the growth of developing eggs in fruit flies, findings that further the field's understanding of how egg cells form and differentiate themselves from other sister cells, according to a study published in the *Proceedings of the National Academy of Sciences*.

Oocytes, or developing eggs, are formed from a collection of sister cells inside an ovary when one cell differentiates itself as an oocyte and the others become “nurse” cells supplying it with “building materials,” the mRNAs, proteins and organelles needed to grow. The nurse cells feed the oocyte and then die off as part of the development process, says Wen Lu, PhD, research assistant professor of Cell and Developmental Biology and first author of the study.

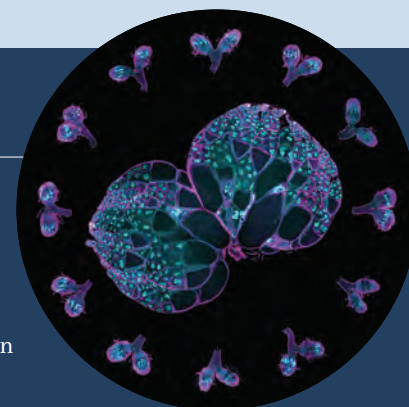
“We call this ‘winners take all,’ and these interconnected

cellular structures are highly conserved; you can see this happen all the way from fruit flies, our model system, to mammals, including human beings,” Lu says.

The mechanisms behind this process, however, were not well understood, and prompted further exploration by the laboratory of Vladimir Gelfand, PhD, the Leslie B. Arey Professor of Cell, Molecular, and Anatomical Sciences and senior author of the study.

“Essentially these oocytes are parasites,” says Gelfand, who is also a professor of Cell and Developmental Biology. “They are not making proteins, everything is done in the nurse cells and pumped into the oocyte along microtubules, these tiny cargo tracks, by a molecular motor cytoplasmic dynein.”

The study was supported by National Institute of General Medical Sciences grant R35GM131752.



DISEASE DISCOVERIES

Investigating the Role of DNA Damage in Cardiac Hypertrophy



A new finding published in *Circulation* suggests that inhibiting DNA damage could be an effective therapeutic strategy for treating cardiac hypertrophy. A study led by Hossein Ardehali, MD, PhD, the Thomas D. Spies Professor of Cardiac Metabolism, found a novel cellular pathway that regulates DNA damage and structural changes in cardiomyocytes, which contributes to the development of cardiac hypertrophy.

In the study, Ardehali's team examined the role of a member of the AMPK protein family, the Snf-1 related kinase or SNRK, in DNA damage. Ardehali's lab had previously discovered that SNRK improves mitochondrial efficiency, or energy production, in cardiomyocytes.

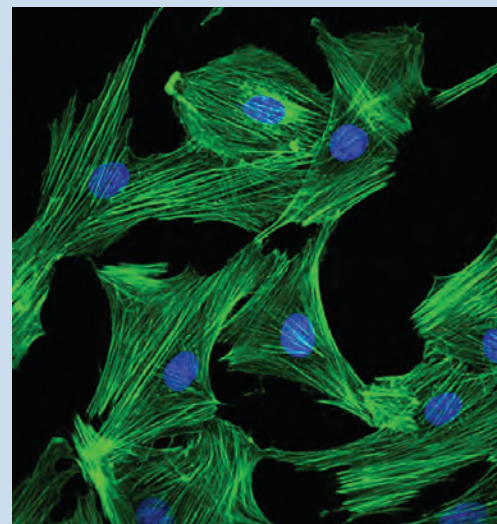
“We wanted to see if the increase in DNA damage is the mechanism for the cardiac hypertrophy in these mice and understand

the mechanism that is responsible for this phenotype,” Ardehali says.

The investigators administered a pharmacological stabilizer of F-actin to the SNRK-knockout mice, which led to an inhibition of DNA damage and reduced nuclear morphology in cardiomyocytes.

“We are hoping that in the future, we can use this drug to prevent cardiac hypertrophy. This is a novel approach to cardiac hypertrophy,” Ardehali explains. “People have looked at so many different transcription factors, so many processes, including processes that are involving calcium handling for cardiac hypertrophy, but this is a novel approach, and we want to hopefully see whether or not we can reverse this process in the future in large animal models and in humans.”

This work was supported by National Heart, Lung, and Blood Institute grants HL127646, HL140973, HL138982 and HL140927, and the Leducq Network.



“WE WANTED TO SEE IF THE INCREASE IN DNA DAMAGE IS THE MECHANISM FOR THE CARDIAC HYPERTROPHY IN THESE MICE AND UNDERSTAND THE MECHANISM THAT IS RESPONSIBLE FOR THIS PHENOTYPE.”

First-Year Medical Students Welcome New Academic Year at Founders' Day 2023

First-year medical students donned their white coats for the first time at Founders' Day on August 4 at Fourth Presbyterian Church in Chicago. The annual celebration welcomes a new class of medical students to campus, honors Feinberg's founders, and marks the official start of the academic year.

"It feels a little bit like a homecoming, coming back to Chicago. I have my mom here, I have my friends here, so I'm excited for this new chapter. I'm excited to be a Northwestern student, a Wildcat," says Ibrahim Mokhtar, a first-year medical student.

Mokhtar, who completed his undergraduate studies at the University of Southern California, attended Founders' Day with his friends and mother. Mokhtar's mother immigrated to the United States from Sudan before he was born. When Mokhtar was five, his father passed away while he and his mother were visiting Sudan. Left with the choice to either stay in Sudan or go back to the U.S., his mother decided to go back to the U.S. because she knew her son would have better educational opportunities.



“It’s something that I’ve dreamed about since high school and to actually be wearing the white coat and recognizing how much of a privilege this is has been absolutely amazing.”

ANUSHREE ANEJA



“Getting this white coat means honoring her sacrifice, it means honoring my late father, it means proving some of the people in my family back in Sudan wrong who thought that she wouldn’t be able to do it as a single mother here. It represents the love that my mom has for me, and I’m very grateful to put on this white coat and prove her right,” Mokhtar says.

Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, spoke about Feinberg’s history of distinguished physicians and scientists and affirmed the class of 2027 that their medical school journey at Feinberg will be fulfilling and filled with ample learning and growth.

“You may be rest assured within the broad opportunities at Feinberg you will find a problem to solve conducive to your inclinations. Feinberg, as it always has, will prepare you well for whatever path you choose to follow,” Neilson proclaims.

Kathleen Hagerty, PhD, provost of Northwestern University, also affirmed to students that she looks forward to how this year’s incoming class will transform the field of medicine and improve the health and lives of communities.

“As Northwestern Wildcats, you have joined a vibrant and diverse community

of thinkers and scholars who are at the forefront of their fields in the arts, science, business, engineering, law, and of course, medicine. You will encounter abundant opportunities for collaboration with scientists and experts across a wide array of disciplines,” Hagerty says.

This year’s Founders’ Day address was delivered by Daniela Ladner, MD, MPH, the John Benjamin Murphy Professor of Surgery and vice chair of Research and Innovation in the Department of Surgery.

Ladner encouraged students to embrace the journey of medical school with every success and failure and emphasized that willingness to learn from failures and mistakes offers opportunities for growth and discovery.

“You have the next four years to learn about all aspects of medicine and what amazing opportunities it has to offer. And then you have your entire career ahead of you to find new opportunities over and over again,” Ladner says.

Marianne Green, MD, vice dean for Education, and Raymond H. Curry, MD, Professor of Medical Education, led the white coat ceremony where second-year medical students helped first-year students put on their white coats for the first time.

“It’s something that I’ve dreamed about since high school and to actually be wearing the white coat and recognizing how much of a privilege this is has been absolutely amazing. My family is here, and both of my parents are doctors and have been such an inspiration to me. Having my closest friends and family around me has made me really realize the impact of this work and just how far I’ve come,” says Anushree Aneja, a first-year medical student.

Together, and with their white coats donned, first-year students then recited the Declaration of Geneva, the modern incarnation of the ancient Greek Hippocratic Oath.

“I wanted to become a physician because I’ve always had the desire to help people,” says Jasmayne McCoy, a first-year medical student. “You can help people in a multitude of professions, but I personally wanted to be a physician because I wanted to help people live in a body that is not their prison. As a physician, whether as an ophthalmologist, an orthopedic surgeon, I want to be able to help people in some way to live in a body that helps them experience life to the fullest.”

Feinberg Receives Record-Breaking Research Funding in 2023

Feinberg principal investigators secured \$706 million in research funding and awards during the 2022-23 fiscal year, which is a nearly 9 percent increase over the previous year, and the largest amount in the school's history. More than 70 percent of Northwestern University's total research funding dollars come from Feinberg; this year the University received more than \$1 billion in research funding.

The all-time high research funding supports research projects with transformative potential in basic science, clinical research, and translational developments. In the last academic year, Feinberg faculty members published 328 research articles in the most prominent and prestigious journals, an increase of 257 percent from 2011.

"Due to the creativity and hard work of our faculty, we had another stellar year of continued growth and funding," says Rex Chisholm, PhD, vice dean for scientific affairs and graduate education and the Adam and Richard T. Lind Professor of Medical Genetics.

"Due to the creativity and hard work of our faculty, we had another stellar year of continued growth and funding."

REX CHISHOLM, PHD

"Our year-over-year growth is quite remarkable, and we are excited to see this funded research come to fruition in laboratories and eventually in clinical spaces."

"This incredible milestone speaks to the work of our faculty and their dedication to improving human health," says Eric G. Neilson, MD, vice president for medical affairs and Lewis Landsberg Dean. "I want to extend my gratitude to the faculty, staff, students, and trainees who are passionately pursuing research in their fields for the betterment of all humankind and contributing to this record-breaking funding year."

Roughly 28 percent of awarded funds were allocated towards basic science department funding and 72 percent towards clinical department funding. Of the total, \$477 million was awarded from the National Institutes of Health (NIH), a more than 6 percent increase in funding from the NIH over the previous fiscal year. Individual grant awards included 73 individual research fellowships (F awards), 66 career development awards (K awards), and 30 training grants (T awards).

**\$1
BILLION+**

RAISED IN RESEARCH
FUNDING IN 2023



Feinberg Launches Master's in Health Professions Education



Marianne Green, MD

Northwestern University Feinberg School of Medicine has launched a new master's degree program in Health Professions Education designed to give healthcare professionals the tools to be leaders in how healthcare is taught and practiced.

The two-year, part-time executive program will provide a rigorous environment for training and discovery with an emphasis on diversity, equity, inclusivity, and

belonging, as well as emerging technology.

The program will include in-person residencies which cover topics such as mastery learning and simulation-based curricula design, offering students the opportunity to broaden their knowledge areas and develop new skills.

“Rapidly advancing technology is changing how we teach and assess learners. Younger generations have expectations for a learning environment and curricular delivery that is inclusive and caters to diverse learning styles,” says Marianne Green, MD, vice dean for Education and the Raymond H. Curry, MD, Professor of Medical Education. “Our program will equip educators with the modern knowledge, skills and credibility needed to excel in their field, shaping the next generation of healthcare professionals and contributing to advancement in medical education practices.”

Most of the course material is accessible remotely, and all students in a cohort convene for in-person coursework four times during the program. During these on-campus periods, students spend four days participating in class sessions, engaging with instructors and classmates to develop their capstone project.

The curriculum will benefit aspiring health professions educators from a variety of clinical backgrounds, including physicians, nurses, physician assistants, physical therapists, and prosthetic and orthotics clinicians.

“Younger generations have expectations for a learning environment and curricular delivery that is inclusive and caters to diverse learning styles.”

MARIANNE GREEN, MD



NORTHWESTERN HOSPITALS RANK AMONG THE BEST BY U.S. NEWS & WORLD REPORT

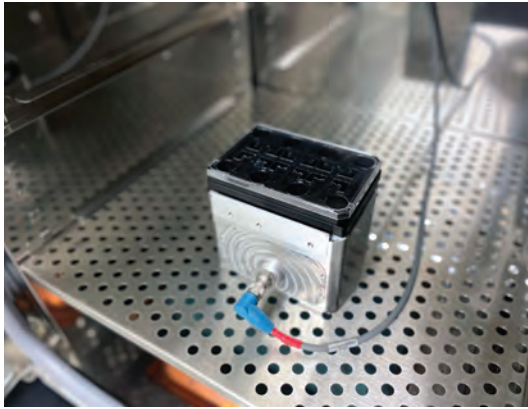
In its annual Best Hospitals rankings, *U.S. News & World Report* has once again recognized Northwestern Medicine hospitals as leaders in clinical excellence. For the 12th consecutive year, Northwestern Memorial Hospital has been named to the Best Hospitals Honor Roll, a select group of only 22 hospitals recognized for their exceptional performance across specialties, procedures, and conditions.

“Our rankings reflect the dedication of our outstanding physicians, nurses and staff to the patients they care for and the communities we serve,” says Howard B. Chrisman, MD, MBA, president and chief executive officer of Northwestern Memorial HealthCare. “It is this shared commitment and focus that allows us to push the boundaries of medical science and provide groundbreaking care, from discovery to delivery, and shape the future of healthcare.”

For the first time, U.S. News & World Report Honor Roll hospitals will not receive a national numerical ranking. Instead, all hospitals selected for the Honor Roll will be designated as number one in both their state and regional rankings. In states and regions with more than one Honor Roll hospital, such as Illinois, the number one designation will be shared. Hospitals that are not on the Honor Roll will continue to be ranked within their state and metropolitan area.

Meanwhile, Shirley Ryan AbilityLab (previously known as the Rehabilitation Institute of Chicago) continues to be recognized as the national leader in rehabilitation, topping the U.S. News list for 33 consecutive years. The AbilityLab is the only hospital of its kind to hold this distinction. This past summer, U.S. News placed Ann & Robert H. Lurie Children's Hospital of Chicago as the top children's hospital in Illinois, and seventh in the region.

MEDIA SPOTLIGHT



U.S. News

Implant Can Warn Weeks Early That Transplanted Organ Will Be Rejected

Receiving an organ transplant can be a nerve-wracking, if lifesaving, affair. An experimental implant now in testing could one day help organ recipients find some peace of mind, Feinberg investigators say. The tiny, paper-thin implant appears to provide early, accurate, real-time warning of organ rejection, according to a new study published in the journal *Science* on September 7.

The ultrathin soft implant sits directly on a transplanted kidney and can detect temperature changes that can occur with transplant rejection, scientists reported. The device then sends a wireless alert to a nearby device, warning that something might be going wrong.

Investigators tested the device in small animals with transplanted kidneys. The device wound up detecting warning signs of rejection up to three weeks earlier than current monitoring methods. This extra time could enable physicians to intervene sooner, reducing the risk of organ rejection.

“If rejection is detected early, physicians can deliver anti-rejection therapies to improve the patient’s health and prevent them from losing the donated organ,” says John Rogers, PhD, Louis Simpson and Kimberly Querrey Professor of Materials Science and Engineering. Lorzeno Gallon, MD, professor of Medicine and Surgery, was also a lead of the study.

npr

Vegetarianism May Be in the Genes, Study Finds

From Impossible Burger to “Meatless Mondays,” going meat-free is certainly in vogue. But a person’s genetic makeup plays a role in determining whether they can stick to a strict vegetarian diet, a new Northwestern Medicine study published in *PLoS ONE* has found.

“A lot of people who want to be vegetarian are perhaps not able to,” Nabeel Yaseen, MD, PhD, professor emeritus of pathology and corresponding author of the study, explains. “We wanted to know if genetics is part of the reason.”

Yaseen and his collaborators compared the DNA of about 330,000 people, using data from the UK Biobank initiative. The study included 5,324 vegetarians, who had not eaten any animal flesh or products derived from animal flesh for at least one year. They found 34 genes that may play a role in adhering to a strict vegetarian diet. And they identified 3 genes that are more tightly linked to the trait.

“What we can say is that these genes have something to do with vegetarianism,” Yaseen says. “Perhaps vegetarians have different variants of these genes that make them able to pursue a strict vegetarian diet.”

The New York Times

How Much Coffee Is Too Much Coffee?

Coffee can be many things: a morning ritual, a cultural tradition, a productivity hack, and even a health drink. Studies suggest, for instance, that coffee drinkers live longer and have lower risks of Type 2 diabetes, Parkinson’s disease, cardiovascular conditions, and some cancers. We asked experts to give us the unfiltered truth.

According to Marilyn Cornelis, PhD, an associate professor of Preventive Medicine, coffee contains thousands of chemical compounds, many of which may influence health.

“Depending on your genetics, it could take anywhere from two to ten hours to clear half of a dose of caffeine from your blood. If you fall on the longer end of that spectrum, a midafternoon espresso may lead to trouble sleeping, whereas if you metabolize caffeine faster, you may not be bothered,” she says.

The Washington Post

The Real Reason(s) Food Allergies are on the Rise

By now, America’s obsession with food allergies is a kind of white noise, a steady thrum at the edge of consciousness. According to analysis of the Centers for Disease Control and Prevention’s National Health Interview Survey, food allergies among children have doubled from 2000 to 2018, and they probably have risen further in the years since.

Christopher Warren, PhD, assistant professor of Preventive Medicine, offered several explanations. One is that we’re over-protecting our kids. That practice was tragically exacerbated by the American Academy of Pediatrics, which, alarmed by rising food allergies, advised parents in 2000 to avoid exposing kids to peanuts or peanut products until age 3. That’s way too late to avoid most food allergies through exposure.

“That led to this whole epidemic of people not feeding their kids the allergens early, which then probably contributed to the increase in allergies because you’re not giving the immune system a chance to train when it’s best suited to learn,” Warren asserts.

FACULTY AWARDS & HONORS



Elizabeth McNally, MD, PhD, the Elizabeth J. Ward Professor of Genetic Medicine and director of the Center for Genetic Medicine, has been awarded the 2023 Martin E. and Gertrude G. Walder Award for Research Excellence. The award recognizes McNally's work as an international authority on human and experimental cardiovascular genetics who has revolutionized our understanding of inherited myopathies. [📍 1](#)

Mary McDermott, MD, '92 GME, the Jeremiah Stamler Professor of Medicine in the Division of General Internal Medicine, has been awarded the American Heart Association 2023 Clinical Research Prize. This nationally recognized award is presented at the Annual Scientific Sessions conference



hosted by the American Heart Association (AHA) to recognize and reward an individual who is making outstanding contributions to the advancement of clinical science and who currently heads an outstanding clinical research program. [📍 2](#)

Yuan Luo, PhD, associate professor of Preventative Medicine, was inducted as a fellow into the American College of Medical Informatics (ACMI), an honorary College of elected Informatics Fellows from the United States and abroad who have made significant and sustained contributions to the field of medical informatics. [📍 3](#)

David Gate, PhD, assistant professor of Neurology, received the American Neurological Association's Derek Denny-Brown Young



Neurological Scholar Award in Neuroscience. The award is given annually to members who are in the first 12 years of their career and who have achieved significant stature in neurological research. [📍 4](#)

Hank Seifert, PhD, The John Edward Porter Professor of Biomedical Research, has received a third Method to Extend Research in Time (MERIT) Award from the National Institutes of Health. [📍 5](#)

Mary Kwasny, ScD, professor of Preventative Medicine, received the Founders Award from the American Statistical Association. [📍 6](#)

Herbert Meltzer, MD, professor of Psychiatry and Behavioral Sciences, Pharmacology and Physiology, achieved the Number 5 lifetime



ranking among all scholars worldwide in psychiatry, according to ScholarGPS. [📍 7](#)

David Cella, PhD, professor of Medical Social Sciences, received the 2023 Tripartite Legacy Faculty Prize in Translational Science and Education. The prize is given annually to a faculty member who has demonstrated excellence in research that emphasizes translational approaches, teaching and mentoring, and leadership. [📍 8](#)

Santhanam Suresh, MD, MBA, '91 GME, professor of Anesthesiology in the Division of Pediatric Anesthesiology and a professor of Pediatrics, has been named the recipient of this year's Excellence in Education Award, given by the American Society of Anesthesiologists. The award recognizes



society members who have made outstanding contributions through excellence in teaching, development of new teaching methods, and/or implementation of innovative educational programs in their field. [📍 9](#)

Mario Shields, PhD, research assistant professor of Medicine in the Division of Hematology and Oncology, has received the National Cancer Institute's (NCI) Cancer Moonshot Scholar Award, a new program that aims to advance cancer science while also diversifying the pool of early-stage investigators and approaches to research that NCI funds. [📍 10](#)

D. James Surmeier, PhD, the Nathan Smith Davis Professor and chair



of Neuroscience, was named the recipient of the 2023 Annemarie Opprecht Parkinson Award, an international award recognizing significant contributions to the field of Parkinson's disease research. [📍 11](#)

Tina Q. Tan, MD, professor of Pediatrics, Northwestern University; Pediatric Infectious Diseases attending; medical director of the International Patient and Destination Services Program; and president-elect of the Lurie Medical/Dental Staff at Ann & Robert H. Lurie Children's Hospital of Chicago, has been appointed president-elect of the Infectious Diseases Society of America (IDSA), a leading professional global infectious diseases society with members who represent a diverse group of healthcare professionals and scientists. [📍 12](#)

A detailed illustration of a human gut's internal surface, showing a dense layer of brown, rounded, villus-like structures. Scattered throughout the scene are numerous colorful, 3D-rendered bacteria in various shapes and sizes, including rods, spheres, and spirals, set against a dark, almost black background.

BY CHERYL SOOHOO

TRUSTING YOUR GUT

Feinberg faculty study how the gut's microbiome affects a wide range of conditions.



Having “good” intestines may be the key to good health. Maintaining a gastrointestinal (GI) tract full of friendly bacteria remains a hot topic for preventing and treating disease. It is now known that the GI tract and the central nervous system communicate via a microbiota-gut-brain axis, leading some to describe the gut microbiome as a “second brain.” Mounting evidence points toward the critical role the gut microbiome plays in myriad disorders ranging from intestinal to neurological and vascular conditions.

In this still-emerging area, Northwestern investigators are exploring how to best leverage the gut microbiome to improve health outcomes. Their novel work ranges from developing innovative diagnostics and treatments to understanding how gut microbiota impact the molecular underpinnings of a range of conditions.

DIAGNOSTIC PROBIOTIC

Some three million Americans suffer from inflammatory bowel disease, according to the Centers for Disease Control and Prevention. Simply known as IBD, this GI disorder causes persistent diarrhea, abdominal pain, weight loss, and permanent damage to the digestive system.

Today, monitoring IBD requires invasive endoscopy and colonoscopy procedures, and predicting flare-ups is a guessing game. Harnessing recent advancements in synthetic biology approaches, Northwestern Medicine scientists have engineered a probiotic capable of noninvasively detecting inflammatory bowel disease. In a study published in the *Proceedings of the National Academy of Sciences (PNAS)*, the investigators manipulated the beneficial bacterium *E. coli Nissle* by adding a protein capable of detecting a known biomarker for IBD.

“The human body contains millions of microbiota, bacteria that are part of healthy, normal human biology,” says senior author of the study Arthur Prindle, PhD, assistant professor of Biochemistry and Molecular Genetics and of Microbiology-Immunology. “We wondered whether those very bacteria could be repurposed to actually sense biomarkers of disease as a way of monitoring and tracking inflammatory bowel disease in humans.”

The Prindle lab’s discovery of a novel transcriptional response to the IBD biomarker calprotectin paved the way for developing an innovative diagnostic. The engineered probiotic works by sensing calprotectin and changing its gene expression and response. Piggybacking on a natural response, the synthetic sensor produces a measurable output that can be used to detect the presence of disease, according to Prindle.

The potential for a more patient-friendly diagnostic tool for IBD offers much promise for simply detecting and monitoring a variety of human diseases. “The current gold standard of IBD monitoring involves expensive, time-consuming, and invasive means,” says Prindle. “What we hope to do is use probiotics as a less invasive and less costly readout of disease.”

FOOD FOR THOUGHT

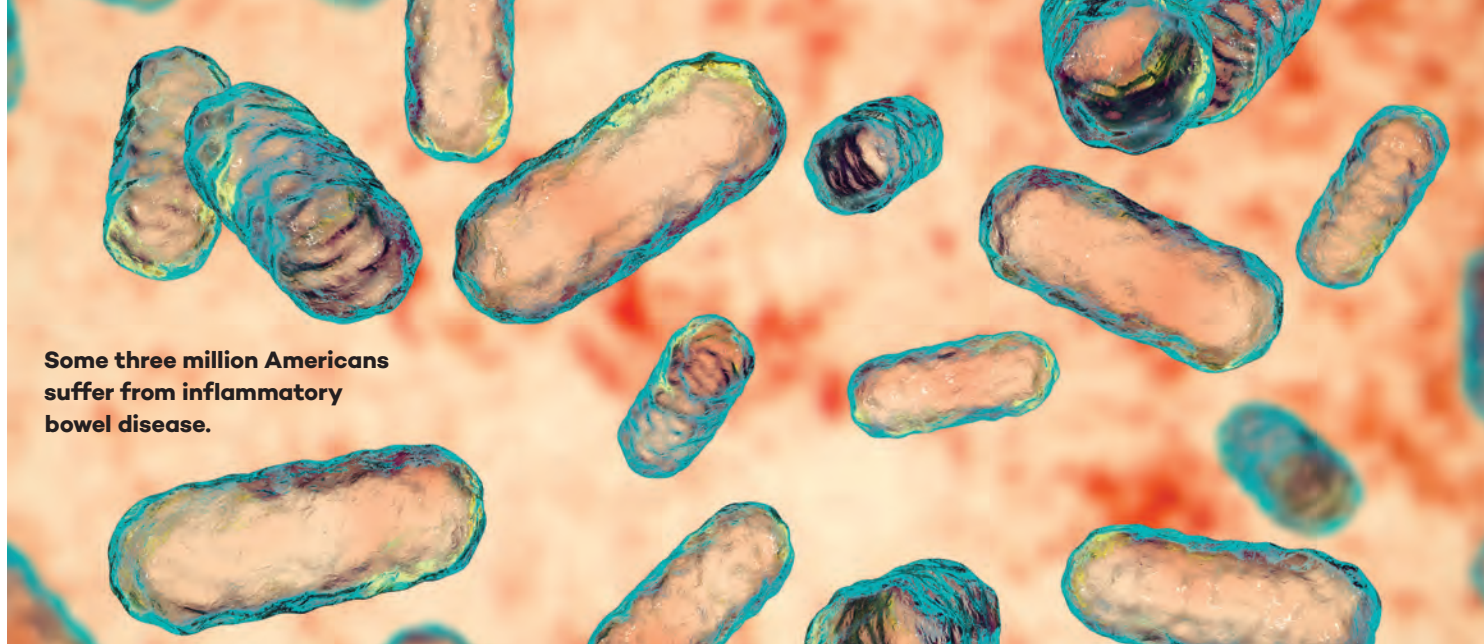
While the gut may seem far from the brain, it has become increasingly clear that the two communicate via the microbiota-gut-brain axis. Running from the brain and through the entire GI tract, the vagus nerve serves as an information highway by relaying chatter between microbiota metabolites and the brain. In animal models, studies have shown that injury to the brain can deplete good bacteria living in the GI tract. These changes can result in gut inflammation, which has been hypothesized to contribute to the harmful neural inflammation often caused by traumatic brain injury (TBI).

A trauma surgeon with a background in immunology, Steve Schwulst, MD, associate professor of Surgery, and his team, which includes gut specialist and postdoctoral fellow Booker Davis IV, PhD, have been investigating how the gut microbiome and brain’s immune system can influence healing after brain trauma in mice. When the brain is injured, ▶



The current gold standard of IBD monitoring involves expensive, time-consuming, and invasive means. What we hope to do is use probiotics as a less invasive and less costly readout of disease.”

ARTHUR PRINDLE, PHD



Some three million Americans suffer from inflammatory bowel disease.

the brain's immune cells (called microglia) become activated. While normally protective in fighting disease, this activation can trigger chronic uncontrolled low-level neuroinflammation that has also been implicated in neurodegenerative diseases like Alzheimer's, Parkinson's, and related dementias.

Schwulst wondered if this neuroinflammation was being fueled by changes in the gut microbiome. Could restoring a pre-injury gut microbiome make a difference? Performing fecal microbiota transplants, the Schwulst team transferred stool from healthy young mice into brain-injured mice. After undergoing doses of healthy gut bacteria, the TBI mice showed marked improvements in their learning and memory capabilities. The therapy appeared to quickly provide significant neural protection.

"It was truly striking to see the results," Schwulst says. "Imagine a car accident victim comes into the hospital with a TBI and you could restore their gut microbial community structure to its pre-injury state with a simple stool transplant. The clinical implications are profound."



Imagine a car accident victim comes into the hospital with a TBI and you could restore their gut microbial community structure to its pre-injury state with a simple stool transplant. The clinical implications are profound."

STEVE SCHWULST, MD

In other studies, the investigators have gathered data that shows TBI decreases a type of gut bacteria that ferments dietary fiber into anti-inflammatory short-chain fatty acids. When the Schwulst lab added the beneficial fatty acids into drinking water provided to TBI-induced mice, the investigators noted enhanced protection of neurocognitive abilities in the animal model. These findings provide interesting food for thought for the potential of using supplements to improve brain injury as well as other neurodegenerative conditions, according to Schwulst.

"Whether it's a stool transplant or replacing certain metabolites, what we are doing is making changes to the overall gut microbial community structure," he says. "This treatment paradigm could hold much promise for treating myriad brain diseases in the future."

PROTECTIVE SUPPLEMENTATION

Clogging of the blood vessels, or atherosclerosis, often requires vascular "plumbing" to avoid heart attack, stroke, amputation, or death. Patients routinely undergo procedures such as balloon angioplasty, stenting, or bypass surgery to remove or get around blockages or "narrowings" impeding blood flow. Yet for some 30 to 50 percent of patients, these interventions can cause an inflammatory response that leads to scarring or neointimal hyperplasia and gradual re-narrowing (restenosis) of the blood vessels.

The gut microbiome's influence on inflammation and wound healing has long driven the work of Karen Ho, MD, the John Marquardt Clinical Research Professor of Vascular Surgery.

As a vascular surgeon, she has a keen interest in improving surgical outcomes. "When patients develop restenosis, they may need more surgery or a different type of operation, for example, to preserve a limb," Ho maintains. Investigating how gut microbes may affect atherosclerosis and arterial remodeling after arterial "injury," the Ho laboratory has steadily connected the dots.

First, the team conducted metabolomics studies analyzing blood samples from patients with advanced peripheral artery disease compared to those without. The investigators discovered a connection between certain metabolites and the severity of disease. Then in 2018, Ho and her colleagues were one of the first to demonstrate the effect of gut bacteria on peripheral blood vessels in a mouse model and establish a direct link between microbiota and the development of restenosis after vascular procedures. Using germ-free mice born in completely sterile conditions and lacking microbiota, the investigators compared the animals' arterial injury response with a group of conventional mice. They found that the germ-free mice had less scarring as well as a decreased inflammatory response, lending support to the influence of microbiota on blood vessel repair. After fecal transplantation using stool from conventional mice, the scarring response after surgery was again observed.

In recent work, the team has focused on the role of supplementing butyrate — a short-chain fatty acid within the same group of metabolites being studied by the Schwulst lab — to prevent scarring and restenosis after arterial injury. "Our thought is if we can

modulate inflammation, maybe we can affect how a patient responds to vascular surgery,” Ho says. Using mice that lacked a receptor for butyrate, the investigators found that these animals developed more restenosis than their healthy counterparts in response to arterial injury. When the mice received butyrate, they developed less scarring and restenosis of their blood vessels.

Supported by a National Institutes of Health RO1 grant, the Ho team is now looking at the mechanism of how butyrate works within cells. “By boosting the microbes that produce butyrate or trying other microbe-targeted strategies, perhaps we can reduce the risk or develop novel drugs to prevent restenosis,” she says.

UPENDING ASSUMPTIONS

Given their location, many gut bacteria aid in digestion and metabolism. The gut microbiome’s possible influence on obesity has generated a great deal of interest as a promising therapeutic target to fight a growing public health concern. While myriad studies in adults and models of mature animals have suggested a causal relationship, very little research has focused on the impact of GI bacteria on obese children and teens. Enter the Pediatric Obesity Microbiome & Metabolism Study (POMMS), part of a National Institute of Diabetes and Digestive and Kidney Diseases study to define the role microbiota may play in weight gain and loss in youth.

“Our aim is to close the gap in the understanding of the microbiome’s effect on obesity and metabolic syndrome in adolescents,” says Patrick Seed, MD, PhD, president and chief research officer of the Stanley Manne Children’s Research Institute at Ann & Robert H. Lurie Children’s Hospital of Chicago. A professor of Pediatrics in the Division of Infectious Diseases, of Microbiology-Immunology and the Children’s Research Fund Professor of Basic Science, Seed serves as the co-principal investigator of the multi-center (Northwestern, Duke University, and the University of North Carolina at Chapel Hill) POMMS.

Launched in 2016, the longitudinal study followed 350 patients, ages 10 to 18: one group undergoing treatment for obesity and another

group of healthy youth of similar ages. In an analysis of microbiome and metabolomic data, Seed and the POMMS investigators have upended the growing literature on the gut microbiome’s impact on individuals across their entire life span.

“Even though the kids had severe obesity and associated metabolic changes, we found their microbiomes did not differ much from that of healthy controls,” Seed contends. “Our data defies the idea that major shifts in the microbiome are an essential ingredient of obesity and metabolic syndrome for every life stage. Once again, children are not just small adults. Or in adults, maybe we don’t have the whole story.”

Seed hypothesizes adolescents may have a certain plasticity and resiliency to metabolic dysregulation. In other preclinical studies, the Seed lab is now trying to understand what adaptations to specific organisms may give youth protective factors against metabolic drivers of obesity.

ADVANCES TO COME

At Northwestern, gut microbiome research continues to gain traction. In October, Feinberg welcomed Yingzi Cong, PhD, a leading microbiome scientist who studies the immune regulation of host-microbiome interaction in the development of inflammatory bowel diseases as well as the role of gut microbiota in producing metabolites that regulate various immune responses and disease conditions. His group was among the first to demonstrate the crucial protective role of T-cells specific for a gut microbiota antigen in the regulation of intestinal inflammation. He was most recently director of microbiome research at the University of Texas Medical Branch in Galveston. Cong’s work has been published in *Nature Communications*, *Gastroenterology*, *Journal of Experimental Medicine*, and *PNAS*. A professor of Medicine in the Division of Gastroenterology and Hepatology, he will be a key leader of new microbiome-based research in the Center for Human Immunobiology (CHI).

“The microbiome field is still very young,” says Stephanie Eisenbarth, MD, PhD, chief of the Division of Allergy and Immunology in the Department of Medicine and director of CHI. “With Yingzi’s expertise, we are poised to take advantage of opportunities in the field to advance our understanding of immune-mediated diseases impacted by the bacterial communities that live within us.” ❖



Yingzi Cong, PhD



Booker Davis IV, PhD



Stephanie Eisenbarth, MD, PhD



Karen Ho, MD



Arthur Prindle, PhD



Steve Schwulst, MD



Patrick Seed, MD, PhD

MASTER OF MITOCHONDRIA

Navdeep Chandel's research revealing how mitochondrial signaling contributes to health and disease was recognized with the prestigious Lurie Prize in Biomedical Sciences.

BY BRIDGET M. KUEHN



Mitochondria are often described as the “powerhouses” of the cell, generating most of the energy needed to power the cell’s biochemical reactions.

During the past century, investigators earned accolades for defining this role. But as this knowledge was inscribed in textbooks, the field faded from the limelight by the 1980s.

Navdeep Chandel, PhD, the David W. Cugell, MD, Professor and professor of Medicine in the Division of Pulmonary and Critical Care and of Biochemistry and Molecular Genetics, set out to discover that mitochondria had other crucial roles beyond their function in energy production. His research demonstrating the crucial signaling role mitochondria play in health and disease is helping thrust the field back into the spotlight.

Recently, his efforts have been rewarded. Chandel and Vamsi Mootha, MD, a professor of Systems Biology and Medicine at Harvard Medical School who studies mitochondrial genes link to disease, were named the 2023

recipients of the Lurie Prize in Biomedical Sciences by the Foundation for the National Institutes of Health (FNIH).

“It’s recognition that the field of mitochondrial research has reemerged into a prominent role in the world of medicine,” Chandel says. “It has come back beyond what is in the textbook.”

The Lurie Prize, which comes with a \$50,000 honorarium, is in its 11th year and recognizes outstanding achievement by promising scientists aged 52 years and younger. The award is made possible by a donation to FNIH from philanthropist Ann Lurie, president of the Ann and Robert H. Lurie Foundation.

For Chandel, the award is more than an individual honor. He is thankful to Ali Shilatifard, PhD, chair of the Department of Biochemistry and Molecular Genetics, who nominated him for the Lurie Prize. Chandel also says he is fortunate to be in the Division of Pulmonary and Critical Care, which provides a collaborative and nurturing environment. That environment was created by former division

chief and the Ernest S. Bazley Professor of Asthma and Related Disorders, Jacob Sznajder, MD, and continues to thrive under the current leadership of Scott Budinger, MD, chief of Pulmonary and Critical Care in the Department of Medicine.

The award is also a recognition of the work of his past and current laboratory members, many collaborators, and mentors including Paul Schumacker, PhD, professor of Pediatrics, of Cell and Developmental Biology, and of Medicine. “You are only as good as the people in your lab,” he says. “The dynamic energy of the people you work with makes the difference.”

BEYOND ENERGY PRODUCTION

Mitochondria use oxidative phosphorylation to produce ATP, an energy source used to fuel the cell’s activities. But early in his career, Chandel started questioning whether there might be more to mitochondria than energy production. As a PhD candidate at the University of Chicago, Chandel studied a mitochondrial

enzyme called cytochrome C oxidase, which is central to energy production. In 1996, a pivotal discovery showed that mitochondria release cytochrome C oxidase, triggering cell death.

“If it is in the wrong location, it causes cell death,” Chandel explains. “That is a signal.”

That study inspired Chandel to focus on mitochondria’s role in cellular signaling when he launched his own laboratory at Northwestern in 2000. He started by studying how hydrogen peroxide produced by mitochondria acts as a signaling molecule. Many scientists believed hydrogen peroxide production by mitochondria contributed to oxidative stress, causing aging, neurodegeneration, and other conditions like heart disease. But clinical studies that used antioxidants to counteract these effects failed.

“Sometimes antioxidants have made things worse,” Chandel says. “Either the antioxidants were not the right ones, or there is more to it.”

Chandel demonstrated that hydrogen peroxide produced by mitochondria acts as a signaling molecule essential to health. “You would not want to disrupt that,” he says. “Mitochondria generation of hydrogen peroxide is so fundamental to everything.” Chandel and his laboratory have begun applying their basic science discoveries to understanding the role mitochondrial signaling plays in many physiologic contexts and diseases.

“If you can identify the signals, we can try to fix them with targeted therapies,” he says. “That will be the rest of my life’s scientific pursuit.”

KICKING AROUND IDEAS

Chandel’s other obsession is soccer, and he plays the sport two to three times a week—something he hopes he can continue until at least age 60—and watches it as often as he can. “A lot of my life is built around soccer,” he says.

The sport is emblematic of how he practices science, emphasizing teamwork and collaboration. That has led to many productive collaborations at Northwestern that have helped make Chandel a highly cited scientist and led to discoveries about the role of mitochondria in lung disease, cancer, and immune related diseases.

“I am a master of one thing—mitochondria,” Chandel says. He often partners

“If you can identify the signals, we can try to fix them with targeted therapies. That will be the rest of my life’s scientific pursuit.”

NAVDEEP CHANDEL, PHD

with other scientists to understand how mitochondrial signaling may contribute to the diseases they study.

For example, a recent collaboration with SeungHye Han, MD, MPH, assistant professor of Medicine, revealed that mitochondrial signaling is essential in lung cell development. In the experiments, Han knocked out the essential ATP-producing pathway in developing mice and found unexpectedly that the mice did not die immediately. Instead, they found that the mice’s lung cells did not differentiate appropriately because of chronic elevation of a stress pathway that eventually led to death.

“Stress pathways should turn on and off,” Chandel explains. “This particular stress pathway turned on and became hyper-activated.” When they gave a small molecule to the mice that tamped down the stress pathway but did not fix the metabolic effect on ATP production, the mice lived. The result suggests potential treatment strategies for rare developmental lung disorders involving these pathways.

Chandel is also working with his long-time collaborator Scott Budinger, MD, director of the new Simpson Querrey Lung Institute for Translational Sciences, to leverage basic science being conducted at Northwestern

to help discover new therapeutics for lung disease. He noted that though it takes decades to translate basic science into the clinic, many recent therapeutic advances, such as cancer immunotherapies, mRNA vaccines and gene editing, are rooted in basic science discoveries. He also works to understand how metformin, a medication widely used to treat metabolic diseases, may work by targeting mitochondria signaling molecules and temporarily turning on stress pathways controlled by mitochondrial complex 1. Previous studies from his lab and others have suggested that chronic inhibition of mitochondrial complex 1 may contribute to Parkinson’s, lung fibrosis, or a rare metabolic disorder called Leigh syndrome that affects the brain. However, he suspects that by temporarily reversibly inhibiting mitochondrial complex 1, metformin may help prepare the body for future stress.

Despite his recent accolade and his many publications in prestigious journals, Chandel says his greatest honor to date is receiving the 2013-2014 Ver Steeg Award, which recognizes a faculty member of the Graduate School of Northwestern University for excellence in working with students. Graduate students in his laboratory nominated him.

“It is still arguably the most touching award I will probably receive in my lifetime, and it is really important to me,” Chandel says. He has mentored 25 graduate students and served on 75 to 80 thesis committees. “Engaging with graduate students and inspiring them about science and making a new discovery together is the greatest feeling on earth,” he says. ❖



PAVING THE ROAD TO GAME-CHANGING WEIGHT LOSS IN AMERICA

Robert Kushner, MD, helped show the effectiveness of new anti-obesity medications that also help reduce cardiovascular disease risk.

BY CHRISTINA FRANK

For people with obesity, new medications like Ozempic and Wegovy — brand names for the anti-obesity drug semaglutide — have been game-changers. They’ve become so popular, in fact, that the companies that make these drugs have been unable to keep up with demand.

“I don’t think anyone really foresaw the incredible increased demand for these medications,” says Robert Kushner, MD, ’80, ’82 GME, professor of Medicine in the Division of Endocrinology, Metabolism and Molecular Medicine and of Medical Education.

Kushner was one of the first investigators to understand the true power of these medications. He was the lead author on a seminal 2021 paper published in the *New England Journal of Medicine* that evaluated the effectiveness of semaglutide in people with obesity. The study found that semaglutide

was up to two times more effective than current weight loss drugs.

Kushner’s work was heralded as a top 10 paper by the Clinical Research Forum and took home the 2022 Herbert Pardes Clinical Research Excellence Award.

He attributes the drugs’ skyrocketing popularity at least partially to social media influencers. While he acknowledges that many influencers do not have clinical obesity and are inappropriately using the drugs for cosmetic weight loss purposes, he believes the attention they’ve drawn to these medications is important.

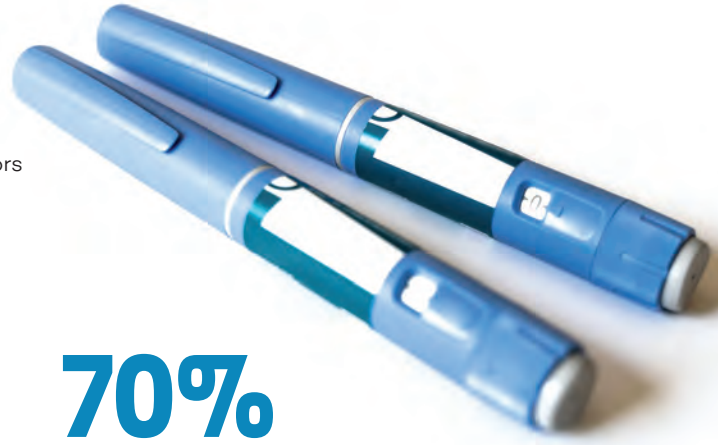
“Patients are coming in asking for these drugs because they’ve seen them on social media and in the news,” Kushner says. “Obesity is a serious disease like hypertension and diabetes that we really need to start paying more attention to, and these drugs mean we can actually do something about it quite effectively in selected individuals.” ▶





STUDY FINDINGS

In the study of semaglutide published in *PNAS*, Kushner and his co-authors found that the drug was almost twice as effective at helping people lose weight than other weight-loss drugs on the market.



14.9%

Average weight loss was 14.9%

20%

1/3 of participants lost 20% or more of their weight

70%

70% of participants reached a weight loss of at least 10% of their baseline body weight

HIGHER LIKELIHOOD OF LOSING WEIGHT

Prior to semaglutide, prescription weight loss drugs (such as Xenical, Contrave, and phentermine) worked by augmenting or changing signaling in the brain or by blocking fat absorption.

The new medications rely on a different mechanism entirely by targeting gut hormones. Glucagon-like peptide-1 (GLP-1), a hormone released in response to food intake, makes patients feel full, stimulates insulin release, inhibits glucagon secretion, and regulates gastric emptying. Semaglutide mimics GLP-1, reducing hunger and food cravings.

Kushner says patients often perceived older medications as dangerous or had negative connotations of them as an “easy way out,” but that perception is being challenged for newer therapies.

“There’s a much greater chance that someone will respond to these current drugs than to previous ones,” he says. “The likelihood of losing 5 percent, 10 percent, 15 percent, or

20 percent of your body weight is significantly higher than with the older medications.”

Kushner stresses that there is no so-called “ideal body weight.” These drugs alter what’s called a set point by creating a new body weight balance or equilibrium. How much weight any given person with obesity needs to lose is largely determined by their specific weight-related health complications.

“We now know that certain medical complications of obesity respond to different levels of weight loss,” Kushner says. “For example, if your blood sugar or your blood pressure is elevated, 3 percent or 5 percent weight loss will have an immediate effect. But if you come in with obstructive sleep apnea or fatty liver disease, 3 to 5 percent weight loss doesn’t seem to have the same impact on improving those complications. You need to lose 10 percent or more of your body weight to make a difference. To resolve urinary incontinence, a common complication of obesity, losing 7 percent of your body weight or more may be necessary.”

REDUCING CARDIOVASCULAR RISK AND IMPROVING QUALITY OF LIFE

The effects of semaglutide on cardiovascular disease has cardiologists eager to harness the drug’s protective benefits.

Results from the randomized, double-blind SELECT (Semaglutide Effects on Heart Disease and Stroke in Patients with Overweight or Obesity) trial published in December 2022 have shown that semaglutide may reduce the risk of cardiovascular events such as heart attacks and strokes in people with obesity. In August, Novo Nordisk (the manufacturer of Wegovy) released topline results that found that 2.4 mg of semaglutide injected once a week caused on average a 20 percent reduction in major adverse cardiovascular events in people with overweight or obesity. Kushner serves on the steering committee for the SELECT trial.

At Northwestern, a clinical trial showed that the drugs can also help patients with heart failure and obesity lose weight while also improving symptoms and increasing exercise capacity (see sidebar).

Other studies have shown that people with complications of obesity were able to get off of medications for blood pressure, heartburn, and diabetes entirely as a result of the weight loss.

“Quality of life goes up,” Kushner says.

“There’s a much greater chance that someone will respond to these current drugs than to previous ones. The likelihood of losing 5 percent, 10 percent, 15 percent, or 20 percent of your body weight is significantly higher than with the older medications.”

ROBERT KUSHNER, MD

GETTING PRIMARY CARE PHYSICIANS ONBOARD

Right now, says Kushner, the “hottest area” in new weight loss drug development is combining two or even three synthesized gut hormones into one medication. While semaglutide only targets GLP-1 receptors, newer drugs such as tirzepatide (Mounjaro) targets GLP-1 as well as GIP (glucose-dependent insulinotropic polypeptide).

Kushner was also a co-author on a study published in *Nature Medicine* in October 2023 that showed tirzepatide, an antidiabetic drug currently used to treat type 2 diabetes, was effective in helping individuals without diabetes who are overweight or have obesity lose weight in combination with other lifestyle changes. The FDA approved tirzepatide in November.

“And indeed, the weight loss is greater with that drug than with the semaglutide alone,” he says. “As you start combining these different hormones together, you get an array of metabolic effects on inflammation, on fatty liver, on the fat cell itself, and on insulin release. So that’s why we are going in this direction. We’re really improving the health of individuals and how much weight loss we can achieve.”

Kushner stresses that a critical piece of the continued success of these drugs is for primary care professionals to engage fully in caring for their patients with obesity. At the moment, he says, these providers often refer patients with obesity to specialists such as obesity medicine physicians or endocrinologists.

“Obesity is very challenging at the primary care level,” he says. “It’s complex. There’s not a lot of training in this disease. It takes time to work with these individuals, and to be fair, primary care professionals have multiple other medical problems to address.”

Right now, there just aren’t enough specialists to be able to handle the 42 percent of the American adult population that has a diagnosis of obesity. Over time, Kushner says, as there’s more familiarity with these anti-obesity drugs, they’ll be used in primary care.

“It’s a very, very exciting time in this field, and we have to keep moving it upstream and not just keep it with the specialist,” he says. “It’s all part of the paradigm shift in how we’re thinking about obesity.” ❖

Weight Loss Drug May Help Patients with Heart Failure



Sanjiv Shah, '00 MD

The weight loss drug semaglutide, sold under the brand names Ozempic and Wegovy, can also help patients with heart failure and obesity lose weight while also improving symptoms and increasing

exercise capacity, according to a clinical trial published in the *New England Journal of Medicine* this fall.

Obesity is known to be a major risk factor for heart disease but has only recently been recognized as a major risk factor for heart failure with preserved ejection fraction, which is increasing in prevalence, affects more than 50 percent of patients with heart failure, and has limited treatment options, says Sanjiv Shah, '00 MD, the Neil J. Stone, MD, Professor and director of the Center for Deep Phenotyping and Precision Therapeutics at the Institute for Artificial Intelligence in Medicine, who was a co-author of the study.

“When it was first recognized in the early 1980s, this syndrome of heart failure with preserved ejection fraction was thought to be due to hypertension and coronary artery disease,” Shah says. “However, over the ensuing decades, due to the alarming obesity and diabetes epidemics, the epidemiology of heart failure with preserved ejection fraction has shifted. The major risk factors for this type of heart failure are obesity and sedentary lifestyle.”

The major abnormality in patients with heart failure with preserved ejection fraction is not the pumping (squeezing) function of the heart; instead, it is stiffening of the heart muscle, which leads to an inability of the heart to fill with blood properly. The end result is pressure backing up in the lungs and an inability of the heart to meet the body’s demands, which can cause significant breathlessness, leg and abdominal swelling, poor quality of life, and poor prognosis.

Given the significant unmet need of heart failure with preserved ejection fraction and the major role of obesity in its development, Shah and other experts in the field were keen on studying the potential therapeutic role of a newer class of weight loss drugs called GLP-1 receptor agonists, including semaglutide. Ultimately, the

advocacy for such trials led to the study, in which 529 patients with obesity and heart failure with preserved ejection fraction were randomly assigned to receive once-weekly semaglutide or placebo for a year.

Patients on semaglutide lost more weight, with a mean percentage change in body weight of -13.3 percent compared to -2.6 percent for patients taking a placebo, according to the trial. At the end of the trial, patients receiving semaglutide could also walk farther than those on placebo and had lower levels of C-reactive protein, a biomarker for inflammation known to drive heart failure. Importantly, compared to placebo, patients on semaglutide also had greater reductions in B-type natriuretic peptide, a biomarker that correlates to severity of heart failure.

“It was really remarkable to see how effective a weight loss drug it was, even in the setting of heart failure” Shah says. “However, we were most interested in whether the drug could reduce symptoms and signs of heart failure itself. We found that patients treated with semaglutide (compared to placebo) had much greater improvements in their health status (which includes quality of life, symptoms, and physical limitations). In fact, health status improved with semaglutide more than any other heart failure medical therapy tested to date.”

Shah’s group at Northwestern Medicine will continue to study additional weight loss drugs to understand the potential benefits they may offer heart failure patients, he says.

“So many of our patients have been written off and ignored for years by health-care providers because they’re overweight; patients with obesity often have shortness of breath and inability to exercise because they have undiagnosed heart failure,” Shah says. “I’m really hoping that clinical trials like the ones we are doing either increase recognition of obesity-induced heart failure, leading to more frequent diagnosis, or that treatment of obesity with GLP-1 receptor agonists and other anti-obesity drugs will treat or even prevent the development of heart failure, even if it is never officially diagnosed in these patients.”

A small number of patients discontinued treatment because of adverse events: 35 in the semaglutide group and 14 in the placebo group. Gastrointestinal issues were the primary reason. The study was supported by Novo Nordisk.



KEEPING AN EYE OUT FOR THE COMMUNITY

Northwestern physicians provide affordable eye care through growing partnership with community clinics.

BY BRIDGET KUEHN

As a college student at Northeastern Illinois University's Bronzeville campus in Chicago, Cheryl Lynn Smalls, 69, needs good vision to plot graphs for her statistics course and for long writing projects.

"Being able to stay on top of my health is more important to me now than ever," says Smalls, who has diabetes and glaucoma.

Smalls receives regular eye care from Stephen Watson, MD, '13 GME, a Northwestern Medicine ophthalmologist, at Near North Health's Komed Holman Health Center on Chicago's South Side — one of the few federally qualified health

centers that offers onsite vision care.

"Near North is filling a void in communities that don't have easy access to major university medical centers or even community hospitals," Watson, who is also a health system clinician in Ophthalmology, explains. "It is focused on primary preventive medicine and giving people an option close to home."

Through a collaboration with Northwestern Medicine, Watson and two other ophthalmologists currently provide eye care for patients at three of Near North Health's locations in communities on Chicago's North, South, and West sides where residents tend have lower income and more barriers

to medical care. Paul Bryar, MD, '95, '98 GME, professor of Ophthalmology and Pathology, began providing this service at the Winfield Moody Health Center on the Near North Side in 2000, followed by Watson in 2014. Anjum Koreishi, MD, '17 GME, assistant professor of Ophthalmology, joined the team in 2017 and provides care at North Kostner Health Center on the West Side. Bryar estimates that each ophthalmologist sees about 800 patients yearly at Near North's clinics.

"Once we realized there was a significant need at other locations, we expanded," Bryar says. A fourth Northwestern Medicine ophthalmologist, David Ramirez, MD, assistant

professor of Ophthalmology in the Division of Pediatric Ophthalmology, will soon join the team to offer pediatric vision screening and eye care to Near North Health patients.

“MEDICAL HOME”

According to Bryar, many Near North patients have chronic conditions like diabetes and require annual eye exams to detect and treat diabetic eye disease. Providing specialist and primary care at a single “medical home” makes accessing care easier for these patients.

“Patients prefer it, and they are generally healthier when they can have all their care under one roof,” Bryar maintains. “It’s also easier for medical teams to communicate with each other.”

Smalls says she appreciated the convenience of accessing multispecialty care at Near North’s clinics, as well as the professionalism of her physicians.

“All my physicians at Near North address me with kindness, sincerity, and care,” says Smalls, who has been a patient at the center for more than 15 years and sees a podiatrist and previously saw a nutritionist at Near North clinics.

Bryar noted that about half of Near North’s patients have Medicare or Medicaid, which may offer eye care coverage. Many have no insurance and few options for vision care, which may lead to delayed diagnosis or vision loss. Receiving low or no-cost care through Near North, a nonprofit organization funded by the U.S. Department of Health and Human Services, can help preserve their vision.

“People without insurance or without

adequate access to eye care often do not see an eye doctor until they develop symptoms such as vision loss. In conditions such as diabetic eye disease or glaucoma, vision loss may not happen until advanced states of these,” Bryar asserts. “It’s much harder to treat eye disease at later stages, and we have less success.

Providing eye care in partnership with Near North allow us to detect eye disease at an earlier stage when it is much more treatable.”

The three Near North clinics offering eye care provide comprehensive exams and manage chronic diseases like glaucoma. In addition, Ramirez joining the team will allow Near North to offer routine pediatric vision exams that are required for school enrollment and allow early identification and treatment for vision loss in children, which can be critical to their success in school and later in life.

“We have patients that have significant vision problems as children, and if we can identify and treat them early, it provides them the best chance to have healthy vision later in life,” he explains.

“When patients require surgery or subspecialty care, the ophthalmologists working at Near North’s clinics may refer them to colleagues at Northwestern Medicine or Cook County Health who can meet their needs,” Bryar says. In fact, Koreishi points out that helping patients experiencing vision problems navigate the healthcare system is a large part of the job.

“Near North has a great support system to help people get insured or to get them to a place where they can receive specialized care beyond what Near North offers,” Watson says.



“Patients prefer it, and they are generally healthier when they can have all their care under one roof. It’s also easier for medical teams to communicate with each other.”

PAUL BRYAR, MD

Watson noted he appreciated being able to quickly get patients in need of care to Northwestern or help them promptly schedule surgery to ensure they get the care they deserve.

“I grew up on the South Side of Chicago, so coming back and helping people who may not have otherwise gotten care has been rewarding,” Watson says. “When those patients eventually return to the Komed Holman Health Center, they are very appreciative.”

Bryar agreed that it is rewarding to be part of the team at Near North working to preserve patients’ vision.

“This started as a pilot program decades ago and has quadrupled in size,” Bryar says. “It demonstrates the need and the importance of collaborations between organizations like Near North and Northwestern Medicine, which have shown a long-term commitment to providing eye care throughout Chicago.” ❖



“Near North is filling a void in communities that don’t have easy access to major university medical centers or even community hospitals. It is focused on primary preventive medicine and giving people an option close to home.”

STEPHEN WATSON, MD





MAKING DEMENTIA 'JUST A MEMORY'

Robert Vassar, PhD, takes over the long-running Mesulam Center as Alzheimer's treatments finally make a breakthrough.

BY EMILY AYSHFORD



“ We had nothing for my mom. I’ve devoted my life to trying to discover the cause of this disease and to find how we can stop it. It’s all in her memory and in her honor. One day, we will be able to say dementias like Alzheimer’s disease are just a memory.”

Robert Vassar, PhD, was just a few years out of college when his mother was diagnosed with Alzheimer’s disease.

It was 1983, and his mother was just 61. At the time, there were no treatments. Scientists and physicians did not yet even understand the mechanisms behind the disease. Vassar, who had been pre-med as an undergraduate biology major at the University of Chicago, had ultimately decided that a career in medicine wasn’t the career path for him. But the diagnosis galvanized him.

He enrolled in graduate school at the University of Chicago to study molecular genetics and cell biology, starting him on a winding path that would include molecular research that contributed to a Nobel Prize and the discovery of an enzyme that could ultimately lead to new treatments for Alzheimer’s.

Now, as he takes over as director of Feinberg’s long-running Mesulam Center for Cognitive Neurology and Alzheimer’s Disease, he’s excited for the future of the field. The FDA has recently approved new treatments for Alzheimer’s, and recent research shows that a combination of therapies might be the key to preventing the disease altogether. Research at the center is at the forefront of understanding the pathogenesis of dementias.

“We had nothing for my mom,” says Vassar, the Davee Professor of Alzheimer Research in the Ken and Ruth Davee Department of Neurology and in the Department of Cell and Developmental Biology. “I’ve devoted my life to trying to discover the cause of this disease and to find how we can stop it. It’s all in her memory and in her honor. One day, we will be able to say dementias like Alzheimer’s disease are just a memory.”

FROM SKIN DISEASE TO ALZHEIMER’S DISEASE

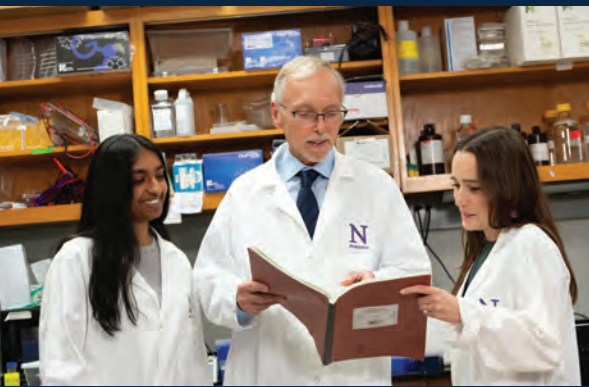
When Vassar entered graduate school at the University of Chicago in 1986, he had dreams of studying the genetic basis of Alzheimer’s disease. But the field wasn’t ready; there was not yet any genetic understanding of the disease. So, Vassar studied skin disease at the molecular and genetic levels, learning the tools of the trade.

When he received his PhD in 1992, he headed to a postdoctoral fellowship at Columbia University in the lab of Richard Axel, MD, professor of Pathology and Biochemistry at Columbia University and investigator at the Howard Hughes Medical Institute, where he studied the neurological underpinnings of our sense of smell. He figured out how olfactory receptors were connected to the olfactory bulb — the first relay station of our sense of smell. The work contributed to Axel receiving the Nobel Prize in Physiology or Medicine in 2004 for decoding olfaction.

“It got me back into neuroscience, using the tools of molecular genetics to decipher problems,” Vassar says. “Then I was ready for Alzheimer’s disease.”

He joined the biotech company Amgen in 1996, building an Alzheimer’s research lab from the ground up. By then, scientists had discovered that the beta amyloid protein formed amyloid plaques in the brains of people with Alzheimer’s disease. Moreover, mutations in certain genes caused genetic forms of the disorder by increasing the production of beta amyloid. That, combined with tangles of Tau proteins, seemed to be responsible for cognitive decline.

Vassar designed an experiment to screen genes that increased beta amyloid, ultimately discovering BACE1 (beta-site APP-cleaving ▶



enzyme). This enzyme, it turned out, is responsible for generating the beta amyloid that forms amyloid plaques. Vassar's research paper on the discovery has since become a classic in the field.

"We ended up starting a whole field of BACE research," Vassar says.

JOINING THE MESULAM CENTER

Vassar left the biotech industry to join Northwestern in 2001, continuing his BACE research. Drugs that inhibited the BACE protein advanced in clinical trials, and Vassar had high hopes that the drugs would ultimately prevent amyloid plaques from forming and perhaps provide a new treatment for the disease. By then it had been nearly 20 years since his mother was diagnosed, and scientists had yet to find new therapies for devastating dementias.

But it wasn't yet meant to be. The high dosages of the inhibitors caused patients' cognition to decline even more — the exact opposite of what scientists had hoped they would do. "That was a big disappointment," Vassar says. Still, he and his colleagues in the field think the inhibitors may be safe at a lower dosage that reduces beta amyloid production enough to prevent Alzheimer's,

a goal toward which they are now focused.

Despite the disappointments, Vassar continues his research on BACE, and studies the molecular and cellular mechanisms of Alzheimer's disease. "The more we understand about the pathogenesis at a molecular level, the more we can identify new drug targets that we would then be able to therapeutically intervene with and help alleviate Alzheimer's disease," he says.

Throughout his time at Northwestern, Vassar has been a key member of the Mesulam Center, a hub for dementia research and personalized diagnostic and clinical care. The center was founded in 1996 as a National Institutes of Health-funded Cognitive Neurology and Alzheimer's Disease Center (CNADC P30). At the helm was Marsel Mesulam, MD, a giant in the field of neurology. In the 1980s, Mesulam had identified primary progressive aphasia (PPA), a rare dementia that affects a person's language, as a distinct syndrome. As director of the center, he saw funding be renewed without interruption for more than 25 years, and the name of the center was changed to honor him in 2018.

When Mesulam decided a few years ago to step down, he wanted Vassar to take over "so he could introduce more molecular science to our already thriving clinical, neurocognitive, and imaging portfolios on dementia and brain aging," says Mesulam, chief of Behavioral Neurology in the Department of Neurology and the Ruth Dunbar Davee Professor of Neuroscience. "Bob now has unique and enhanced opportunities to pursue this mission and integrate it with the other strengths of the center."

Vassar ultimately took over in January 2023. "To me, it's a great honor to follow in his footsteps," Vassar says. "Those are huge shoes to fill."

As director, Vassar hopes to encourage even more groundbreaking research at the center, especially by harnessing leading-edge technology such as single-cell RNA sequencing and transcriptomics. He also plans to encourage the center's other successful research programs. Not only do scientists there study the pathogenesis of dementias in the brain, but they also study the brains of those who maintain youthful memory function. These so-called "SuperAgers" are adults over

80 who have the memory abilities of those in their sixties or even fifties.

"We're looking at all aspects of their lives — their lifestyles, their genetics — and following them over time to understand the secret of superaging," Vassar says. "The hope is that it might stimulate how we can help people avoid age-related dementias."

CREATING A TOOLKIT OF THERAPIES

The center is also involved in a clinical trial for the drug lecanemab (commercially known as Leqembi), which was recently approved by the FDA. The drug, an antibody, stimulates the brain's microglial cells to remove amyloid plaques. About 70 percent of people on the drug have no more amyloid in their brains after a year.

Still, it has side effects, and it doesn't cure the disease; patients ultimately find that the disease still progresses. But Vassar is hopeful that might be one tool in the toolkit against Alzheimer's and dementia — one that he hopes will ultimately include BACE inhibitors. In his lab, he's still researching BACE, hoping to find the right dose to make it safe and effective for patients.

With approved therapies and those on the horizon, it's possible that one day those at risk for Alzheimer's could take a blood test that could reveal the beginnings of amyloid plaque in their brain. Then, they could take a suite of therapies to stop progression.

"We're going to end up with whole toolkits of different drugs that tackle different targets in the Alzheimer's disease pathway," Vassar says. "If we look at primary prevention, we could stop the production of beta amyloid and perhaps completely prevent the onset of Alzheimer's."

How far away that reality is remains to be seen. For now, Vassar is continuing his work — and ensuring his own health. Research shows that exercise and cognitive stimulation can both help and prevent Alzheimer's. Most days, you can find Vassar and his wife in the gym, doing both cardiovascular and resistance workouts. He also loves to spend time with his three adult stepchildren and their children, as well as listen to jazz and hike at the Indiana Dunes.

"Having an enriched life is good for preventing Alzheimer's," he says. "My mother died in a vegetative state, and I'm doing everything I can to prevent myself and others from doing the same. We've had a lot of false starts and setbacks, but the future is bright." ❖



Alumni Weekend Reflections

By MAAB President Nupur Ghoshal, '01 PhD, '03 MD

Autumn is a time for reflection, and this year that coincided perfectly with Alumni Weekend festivities in Chicago. As you all know, fall in Chicago is a sight to behold, and the ability to reconnect with med school classmates back at our old stomping grounds makes the season even better. Although I could not experience all of the weekend's activities, the events I did attend provided me with the opportunity to reflect on my time at Feinberg and what the Northwestern community means to me.

The weekend kicked off on Thursday, October 12 with a celebration of the 20th anniversary of the Office of Diversity and Inclusion (ODI). It was a wonderful reception that offered attendees the chance to look back on the thought leaders whose efforts culminated in the creation of the ODI. In an effort to realize their goals moving forward, ODI announced a new \$10 million fundraising initiative. After this special celebration ended, I connected with a small group of alumni at dinner and continued the fellowship late into the evening.

Friday was a full day of programming that started with alumni checking in and picking up their itineraries, tickets, and, most importantly, their NU swag. The day's programming included many opportunities for alumni to reacquaint themselves with the campus through tours and the Mentoring Lunch with Feinberg Students and Fellow Alumni, where we shared a meal and discussed our experiences at Feinberg with current med students. My table ran the gamut of neurologists who are retired, in academia, or in private practice. It was a perfect microcosm

of our field, and the students' questions were spot on. They expressed interest in our chosen career path, and we provided some guidance to help them navigate their future. After the exhilarating lunch conversation, I made my way over to the Drake Hotel for the Women in Medicine Tea, which has become a signature Alumni Weekend event over the past several years. The panelists were amazing, openly sharing their own career experiences, challenges, and successes, as well as lessons learned. The Tea ended with the audience joining in on the rich conversation during the Q&A session. Back on campus, the Conversations with the Dean session quickly shifted to the Celebrate in Chicago Dinner. After the dean's opening remarks, I had the privilege of recognizing each of the reunion class years present. Let me tell you, the enthusiasm in the room was palpable, and the competitiveness among the alumni to demonstrate said enthusiasm was true to form for a group of reunited gunners. I particularly enjoyed introducing the newly-formed Half Century Club, which recognizes alumni who are greater than 50 years out of med school. It was delightful to see this vibrant group in person among us.

Much like Friday, Saturday was also jam-packed with a number of activities. The Pancakes and Perspectives Breakfast gave students another opportunity for networking and finding a mentor. I was joined by members of the Alumni Board to have a working meeting to review our activities to date and brainstorm about what more we can bring to students and alumni in the new year. Next, I had the pleasure of attending the Commitment to

“Alumni Weekend offers a means in which we can reconnect with one another and the school that is our common touch point, as well as reflect on what it means to be a Feinberg alum.”

Scholarships Luncheon, where I was able to see the talent and excellence of the current student body firsthand. In the evening during the Founders Society Reception, I mingled with a range of different Alumni Weekend attendees, from alumni who have given back to Feinberg in very meaningful ways to a second-generation alumna in the making. The night ended with an assortment of reunion dinners, including one dedicated to the Half Century Club, which I attended. I thoroughly appreciated being among this prestigious group, discussing their experiences at the medical school and how their careers took off after their time at Feinberg.

Alumni Weekend offers a means by which we can reconnect with one another and the school that is our common touch point, as well as reflect on what it means to be a Feinberg alum. I encourage you to attend the next Alumni Weekend so you too can reconnect with Feinberg and reflect on your time on this beautiful campus in this phenomenal city.

Feinberg Classmates Reconnect at Alumni Weekend 2023

For Alice Yeh, '93 MD, returning to Feinberg for Alumni Weekend was an emotional, full-circle moment in her career as a surgeon.

"When I left Feinberg, I had gotten my degree and was just going out into the world. It brings up emotions just talking about it," said Yeh, who returned to Chicago for the first time in the 30 years since she graduated. "I'm near the end of my career, and I have retirement on the horizon. I wanted to come back and see where I was when I first started. This is a very fulfilling moment for me."

It was during her time at Feinberg that Yeh was inspired to go into surgery. One of her mentors at the time let her scrub in on an open-heart surgery. When she peered over the drape, she saw a patient's beating heart for the first time. In that moment, she came to understand the importance of the specialty she would go on to devote her career to. Now, Yeh practices surgical oncology at the Kaiser Permanente South San Francisco Medical Center.

"I'm very proud of where I trained, and it's exciting to connect with my roots," Yeh said of Feinberg. "I'm hoping in my future I can give back to the place that has invested so much in me."

Yeh was one of the more than 400 alumni and guests who returned to Feinberg on October 13 for two days of reconnecting and reminiscing with former classmates about their experiences at Feinberg and learning about the medical school's latest achievements.

As a member of the Half Century Club — alumni who have been graduated for 50 years or more — Tom F. Keys, '63 MD, said he was excited to visit with classmates and offer his wisdom to current students.

"There are not that many of us that are here from the class of 1963, but I've already met most of them and it's just fun reflecting on what you did, where you share your memories," said Keys, a retired infectious disease specialist. "I think the reason that I'm here is that I feel very strongly about medical education, making sure that our young people get a broad base and a reality check about what it's like to be a good doctor."

During the weekend, alumni attended various social and educational events, including class dinners, tours of Chicago attractions, and tours of campus facilities, including the Northwestern Simulation Center and the Louis A. Simpson and Kimberly K. Querrey Biomedical Research Center.

Chandra Jadhvani, '87 PT, who currently practices in Illinois, said she particularly enjoyed the walking tour of Chicago, during which she learned more about the history of the various hospitals and medical centers in Chicago.

The weekend's activities also included educational forums and lectures led by Feinberg faculty who discussed topics ranging from pathogen genomics and the biology of aging to the latest developments in artificial intelligence and digital technology in medicine.

Following lectures on Friday afternoon, alumni and current Feinberg students mingled for a mentoring lunch, which was organized based on medical specialties.

"I wanted to come back this weekend to see some old classmates and pay homage to the medical school that gave me a wonderful career," said Martin G. White, '60 '63 MS MD, who celebrated his 60th reunion and shared his experiences in nephrology with current students during the lunch. "For a while now, I've been involved with teaching and encouraging young people to advance in their careers. I hope they appreciate this wonderful school and the generosity of those who support it."





“I’m delighted to give our alumni an update on what’s happening and where things are heading. In 2023, Feinberg is almost a billion-dollar enterprise. It has a very large research portfolio, now over 700 million dollars.”

ERIC G. NEILSON, MD



Nearby at Chicago’s historic Drake Hotel, alumnae gathered for the annual Women in Medicine Tea, which included a panel discussion featuring alumnae from various class years who shared their own professional journeys and advice about navigating career advancement and work-life balance.

The session was moderated by Shelly Vaziri Flais, MD, clinical assistant professor of Pediatrics in the Division of Community-Based Primary Care, who encouraged attendees to embrace non-traditional career trajectories and give themselves grace when it comes to balancing career and family.

“When I got back from maternity leave, my boss at a family practice pulled me into his office and said, ‘I need you to work more, and if you can’t, I’m going to hire someone who will,’” Flais said. “It was devastating at the time. But it ended up being a wonderful thing for me. I had twins

and had become very passionate about helping other families with twins, which led me to publish my first parenting book.”

The day was concluded with remarks from Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, who gave an overview of the state of the medical school during “Conversations with the Dean.”

“I’m delighted to give our alumni an update on what’s happening and where things are heading,” Neilson said. “In 2023, Feinberg is almost a billion-dollar enterprise. It has a very large research portfolio, now over 700 million dollars.”

Neilson went on to update alumni on the medical school’s recent achievements, which included Feinberg’s involvement in the Chan Zuckerberg Biohub Chicago and ranking among top medical schools in the country.

On Friday evening, attendees gathered for an all-alumni reception and

dinner which included a salute to the milestone reunion classes, ranging from the class of 1973 to 2013.

During the dinner, this year’s Distinguished Alumni Award was presented to Anthony J. Schaeffer, ’68 MD, the Herman L. Kretschmer Professor of Urology, whom Neilson lauded as an expert in his field.

Schaeffer, who has published more than 400 peer-reviewed research articles, dedicated his career to understanding urinary tract infections, inflammation, and incontinence. He was the first to describe the systemic changes of bacteria that cause UTIs in women and developed novel management techniques.

“Tony joined Northwestern’s department of Urology and he quickly rose through the ranks, and he led as department chair for 25 years. He’s been the recipient of many prestigious honors, but if you ask Tony, he’ll say his proudest accomplishment is his family,” Neilson said.

Scott Hultgren, '87 PhD, is developing new antibiotic-sparing drugs to treat urinary tract infections based on his decades-long research on host-bacteria interactions.

A New Way to Beat Bacteria



Each week, Scott Hultgren, '87 PhD, fields calls and emails from both women experiencing chronic pain from recurrent urinary tract infections (UTIs) and their physicians asking about the experimental therapies he's developing. Many of these women have been treated with repeated rounds of antibiotics and have had their quality of life suffer because of the discomfort caused by the infection or the side effects of the antibiotics.

"We need something because antibiotics aren't working," says Hultgren, the Helen L. Stoever Professor of Molecular Microbiology and Director of the Center for Women's Infectious Disease Research at Washington University School of Medicine in St. Louis.

Urinary tract infections are one of the most common infections treated in the United States, and they disproportionately affect women, Hultgren notes. About half of all women will have a urinary tract infection in their lifetime, and about one in four will experience recurrent UTIs.

"It is a big gap that we're trying to fill," he says. But after 30 years of research detailing

how *Escherichia Coli (E coli.)*, the bacteria that causes most UTIs, binds to the bladder, Hultgren and his colleagues are on the verge of translating their discovery into innovative, antibiotic-sparing treatments and new prevention approaches for UTIs and other common and difficult-to-treat infections.

FROM GERMAPHOBE TO EXPERT

Growing up in a small town in Indiana, Hultgren is the son of an award-winning high school chemistry teacher whose former students would frequently return to visit.

"My dad had a knack for reaching kids and bringing out the best in them," he explains. "Part of me wanted to train young people for careers like my dad did."

Following in his father's footsteps, he started as a chemistry major at Indiana University. But a microbiology course with the late Walter Konetzka, PhD, turned a childhood fear of germs into a fascination with microbes and microbiology. Hultgren enjoyed the overlap with immunology and understanding how the immune system responds to pathogens, the structural biology involved

in understanding how the pathogens interact with their host cells, and the role of biochemistry and biophysics.

"Microbiology is important to understand to cure many diseases," he says. "It blends all these disciplines."

Hultgren graduated with a degree in microbiology from Indiana University in 1981 and was hired as a research associate in the Department of Pathology at Northwestern. There, Hultgren met Anthony J Schaeffer, '68 MD, the Herman L. Kretschmer Professor of Urology, and began working in his laboratory studying how *E. coli* clings to the lining of the urinary tract, causing infections. That's when Hultgren began his decades-long studies of how hairlike fibers called pili help the bacteria colonize the urinary tract and cause infections.

"Tony was a superstar and one of the few urologists studying infectious diseases," Hultgren maintains. "He is still an important part of my life today."

CAREER HIGHLIGHTS

1981
Graduated from the Indiana University with a bachelor's degree in microbiology

1981-1983
Worked as research associate in the Department of Pathology at Northwestern University

1987
Graduated from Northwestern with a PhD in Microbiology

1989
Completed a postdoctoral fellowship at the University of Umeå in Sweden

1989-2000
Joined the faculty at Washington University, ultimately becoming a professor of microbiology

2000
Named the Helen L. Stoever Professor of Molecular Biology

The work inspired Hultgren to pursue a graduate degree at Northwestern, and he continued his research on pili during his graduate studies with his late mentor James Duncan, DDS, PhD, a professor in the Department of Microbiology and Immunology.

“Jim was an amazing mentor,” says Hultgren. “He was incredibly humble and there for you every day. We had a great relationship, a great friendship.”

Hultgren developed strong friendships with some of his graduate school classmates and orchestrated an annual outing to a Chicago Cubs baseball game for his classmates.

“I’m grateful for the opportunities I had at Northwestern,” he asserts. “They catapulted me into my postdoctoral studies and today they remain one of the best Microbiology Departments in the world with the likes of Hank Seifert and Nick Cianciotto.”

Hultgren completed his postdoctoral studies at the University of Umeå in Sweden in the laboratory of Staffan Normark, PhD, who ran one of the first departments in the world devoted to host-pathogen biology. “We had the eyes of the world on us. It was very exciting,” Hultgren says. “To this day, we are still living in Normark’s vision.”

Umeå is near the Arctic Circle and worlds away from Chicago and Hultgren’s beloved Cubs, but it still holds a special place in his heart. “It was a very different lifestyle, very simple,” Hultgren explains. “My wife and I still have friends there.”

Over time, Hultgren showed that proteins on the tip of pili called adhesins mediate the interaction between the bacteria and the urinary tract. His work has earned him membership in the National Academies of Science and Medicine, the National Academy of Inventors, and the American Academy of Arts and Sciences.

“My laboratory has gone on to dissect that system, which is critical to all kinds of host-pathogen interactions,” he says. “We take a very interdisciplinary approach.”

BREAKING A VICIOUS CYCLE

Physicians treat most UTIs with antibiotics, which can contribute to the emergence of antibiotic resistance and increase the risk of recurrent UTIs.

“The more we treat these infections with antibiotics, the more resistance we build up,” Hultgren says. “It’s a vicious cycle because one of the most significant risk factors for developing a urinary tract infection is use of antibiotics.”

Hultgren explained that antibiotic use can relieve discomfort in patients with UTIs and help their symptoms resolve. But they also disrupt the patient’s microbiome, killing beneficial bacteria that protect against pathogens, leaving them more vulnerable to recurrent infections.

“It makes it easier for pathogens to get back into the gut and recolonize the urinary tract,” Hultgren explains.

Hultgren’s laboratory has developed some alternate, antibiotic-sparing treatment approaches that disrupt the host-pathogen interactions that enable bacteria to colonize the urinary tract. Adhesins help bacteria to stick to mannoseylated glycoproteins on the surface of bladder cells, allowing them to invade the cells and multiply in the bladder. Hultgren’s laboratory has developed molecules called mannosides that outcompete bacteria attaching to the mannoseylated glycoproteins, preventing bacteria from getting a foothold in the bladder. Mannosides developed by Glaxo-Smith-Kline (GSK) are currently being tested in a phase 1b clinical trial run by GSK. Hultgren said mannosides may also reduce

gut colonization with UTI-causing *E. coli*.

“A mannoside can disrupt that vicious cycle because you are not killing anything,” he says. “You are just unsticking the bacteria.”

The team also has a vaccine targeting bacterial adhesins entering phase 2 clinical trials. The vaccine causes the immune system to make antibodies against adhesins, preventing the bacteria from sticking to the bladder. The antibodies also flag the bacteria for destruction by the immune system, providing a one-two punch.

“Having things I’ve been working on for 30 years going into clinical trials has been a big career moment for me,” he says.

If the trials are successful, scientists will likely apply similar approaches to other infections, Hultgren says. Hultgren’s laboratory is already working on a vaccine targeting an adhesin on *Acinetobacter*. This bacterium is one of the most common causes of catheter-associated urinary tract infections and a frequent cause of multidrug-resistant diseases.

“We’ve written a blueprint for developing new anti-adhesin drugs, and we’re going to use it for other diseases.”

“We’ve discovered the adhesin and what it is binding to, and we are developing therapeutics to prevent binding,” he asserts. “It’s exciting because multidrug-resistant infections are a big problem worldwide. They are hard to treat and can be very dangerous.”

Hultgren is hopeful that developing new antibiotic-sparing approaches will interrupt the cycle that contributes to rising rates of increasingly drug-resistant bacteria.

“We’ve written a blueprint for developing new anti-adhesin drugs, and we’re going to use it for other diseases.”

2007-PRESENT

Directs the Center for Women’s Infectious Disease Research

2011

Inducted as a member of the National Academy of Sciences

2012-PRESENT

Founded and became chief scientific officer of QureTech, Bio

2014-PRESENT

Founded and became president of Fimbrion Therapeutics, Inc.

2017

Inducted as a member of the National Academy of Medicine

2020

Became a fellow of the National Academy of Inventors

2023

Named a member of the American Academy of Arts and Sciences

PROGRESS NOTES

*We'd love to hear from you!
Please share your recent
news, accomplishments, and
important milestones with us.*



Send your updates and
high-resolution photos to
medcommunications@northwestern.edu.
We will publish them in an upcoming
issue of the magazine.



Northwestern University Feinberg School of Medicine hosted Alumni Weekend 2023 October 13 and 14 with more than 400 alumni and guests returning to campus to reconnect and reminisce with former classmates. Friday's festivities ended with an all-alumni dinner celebrating the reunion years of various classes. Photo: Randy Belice

1960s

Roger N. Rosenberg, '64 MD, a professor of Neurology and renowned expert in Alzheimer's and other neurodegenerative diseases, has been named professor emeritus after 50 years at the University of Texas Southwestern (UTSW). Prior to joining UTSW as its inaugural chair of Neurology in 1973, a position he held until 1991, Rosenberg had been a member of the faculty at the University of California, San Diego. For over 30 years, he served as director of the National Institutes of Health (NIH)-funded Alzheimer's Disease Center, a patient-care and research center. Rosenberg also served as president of the American Academy of Neurology from 1991 to 1993, during which time he created the AAN Education and Research Foundation (now the American Brain Foundation). He retired from UTSW on January 1, 2023.

1970s

Robert S. Feder '76, '78 MD, '95 MBA ('12 P), was awarded Northwestern Medicine's Gary A. Mecklenburg Distinguished Physician Award during the Northwestern Memorial Hospital Medical Staff Quarterly Meeting. One of the hospital's most prestigious awards, the peer-nominated Mecklenburg Award is presented each year to a physician who

“embodies professionalism and humanism and who demonstrates a strong commitment to enriching the lives of others through research, teaching, patient care, or community outreach.” Feder is director of Cornea Service in the Department of Ophthalmology and professor of Ophthalmology at Feinberg. 📷 1

Mark Nolan Hill, '77 MD, is the 2023 recipient of the Daughters of the American Revolution Community Service Award for his extensive

volunteer work. In addition to a commemorative plaque, the organization bestowed upon him a hand-sewn Quilt of Valor in recognition of his service as a veteran of the Navy. For decades, Hill has been a pillar of the Highland Park community in Illinois, representing the city of Highland Park in the Great Lakes and St. Lawrence Cities Initiative for 20 years; serving as member, former chair, and citizen advisor of the Highland Park Natural Resources Commission for 30 years; volunteering at a free medical clinic; serving as a member of the Highland Park Division Lake County Medical Reserve Corps (LCMRC); coordinating the Highland Park Middle School's Project Citizen; and organizing Warriors and Art: A Path to Healing at the Highland Park Art Center, representing therapeutic veteran's art to the public. Additionally, Hill's Beatles cover band, Dr. Mark and the Sutures, has played pro bono for 36 years at local benefits, charities, and community events. Hill is professor of Surgery at The Chicago Medical School, adjunct professor of Surgery at the Kansas College of Osteopathic Medicine, and president and chief executive officer of North Shore Surgical Associates. 📷 2

1980s

Norman A. Paradis, '84 MD, founder and chief executive officer of CPR Therapeutics, Inc., a medical device startup company, has received a \$1.6 million federal funding award as part of the National Institutes of Health National Heart Lung and Blood Institute Direct-To-Phase II Small Business Innovation Research Award. The award is in support of a multimodal integrated system for improved cardiopulmonary resuscitation (CPR). This advanced-technology automated CPR system will be the first of its kind to integrate and synchronize multiple technological innovations into a single system. The project will be a collaboration with Johns Hopkins Hospital in Baltimore, Maryland. Paradis is an emergency medicine physician and professor of Medicine at the Geisel School of Medicine at Dartmouth College.

Ken Kobayashi, '86 MD, '91 GMER, has been appointed to the Medical Strategy Advisory Board of Dr. Evidence, an evidence-based insights platform for life sciences. Kobayashi has a deep

ROBERT S. FEDER '76, '78 MD, '95 MBA ('12 P), WAS AWARDED NORTHWESTERN MEDICINE'S GARY A. MECKLENBURG DISTINGUISHED PHYSICIAN AWARD DURING THE NORTHWESTERN MEMORIAL HOSPITAL MEDICAL STAFF QUARTERLY MEETING.





background as a clinician-scientist, regulator, scientific diplomat, and drug developer across the U.S., Europe, Latin America, and Japan/Asia. As a senior executive in top-tier pharmaceutical companies including Pfizer, Daiichi Sankyo, AstraZeneca, Janssen, and Novartis, he has successfully overseen the introduction of more than 28 investigational agents and been directly involved with 60 programs, including in the areas of signal transduction inhibitors, epigenetic modifiers, and inflammation/immunotherapy. His experience also includes roles at the National Cancer Institute and the Food and Drug Administration. 📍 3

Charles S. Modlin Jr. '83, '87 MD, former Medical Alumni Association Board member, has been named a 2023 recipient of the Northwestern Alumni Medal — the highest honor given by the Northwestern Alumni

CHARLES S. MODLIN JR. '83, '87 MD, FORMER MEDICAL ALUMNI ASSOCIATION BOARD MEMBER, HAS BEEN NAMED A 2023 RECIPIENT OF THE NORTHWESTERN ALUMNI MEDAL — THE HIGHEST HONOR GIVEN BY THE NORTHWESTERN ALUMNI ASSOCIATION.

Association. Since 1932, the Alumni Medal has celebrated alumni who have made a transformative impact in their fields, performed exemplary volunteer service to society, or demonstrated an outstanding record of support for the University. This year's Alumni Medalists join a distinguished group of more than 100 past recipients who truly exemplify the ideals of the University through their life, work, and service.

1990s

Cate M. Yashar, '91 MD, and **Diane Bronstein Wayne '88, '91 MD ('18, '20 P)**, both assumed chief medical officer (CMO) roles in July 2023. Yashar is CMO at University of California San Diego Health and Wayne is CMO at Northwestern Memorial Hospitals. Yashar and Wayne are close friends and MD '91 classmates. 📍 4

2000s

Josh Levitsky, MD, '08 MS, has been appointed president of the 2023–2024 board of directors of the American Society of Transplantation (AST). Levitsky is professor of Medicine (Gastroenterology and Hepatology), Medical Education, and Surgery (Organ Transplantation) at Feinberg. 📍 5

2010s

Sadiya Khan, '05, '09 MD, '14 MSc, '12 GMER, '16 GMEF, is the lead author of a new Northwestern Medicine study published in the *Journal of the American Medical Association (JAMA)* that finds that CT scans are better at predicting a middle-aged person's risk for a heart disease, such as a heart attack, than genetics. According to Khan, the results of this study “can help doctors and patients in managing risk for heart disease, which is the leading cause of death in the U.S.” Khan is assistant professor of Medicine in the Division of Cardiology and of Preventive Medicine and a Northwestern Medicine cardiologist. 📍 6

Murad Alam, MD, '15 MS, MBA, has been appointed president of the American Society for Laser Medicine and Surgery. Alam is vice chair of Dermatology, professor of Dermatology, Otolaryngology, and Surgery, and chief of the Cutaneous and Aesthetic Surgery section at Feinberg. 📍 7

Brian J. Miller, '11 MD, MBA, MPH, was recently appointed by the U.S. Government Accountability Office to the Medicare Payment Advisory Commission (MedPAC) and the Federal Trade Commission. Miller is assistant professor of Medicine at Johns Hopkins University and a nonresident fellow at the American Enterprise Institute. His research focuses on the Medicare Advantage

program, the U.S. Food and Drug Administration's regulation of pharmaceutical products and medical devices, and competition in healthcare markets. His research leverages his previous experience at the Centers for Medicare and Medicaid Services, the Food and Drug Administration, and the Federal Trade Commission.

2020s

Dale A. Patterson, MD, '20 MS, has been named to the board of directors of the Center for Hospice Care, a not-for-profit, community-based organization. Recently, Patterson also assumed the role of president of Beacon Medical Group within Beacon Health System. He began this new role on January 1, 2023.

Andrea M. Rustad, '23 MD, recently appeared on Minnesota Live to promote her book, "Skin-vincible: A Story of a Superstar with Ichthyosis," a children's book about a young girl with the rare genetic skin condition ichthyosis, written with **Amy S. Paller, MD, '83 GMER**. Rustad spoke about ichthyosis, Camp Discovery, and sunscreen on the show.

Scott Zeller, MD, was featured in *The New Yorker* article "Reinventing the E.R. for America's Mental-Health Crisis". The article delved into Zeller's life's work, highlighting his invention, the EmPATH unit (Emergency Psychiatric Assessment, Treatment and Healing unit). Recognized as a humane, cost-effective, and scalable reimagining of hospital emergency departments (ED), the EmPATH unit is specifically for people experiencing behavioral health emergencies. There are currently several dozen EmPATH units operating in hospitals throughout the U.S. and around the world, including in Singapore, Canada, United Arab Emirates, Scotland, Australia, and South Africa.

DPT

Sara Stotts, '98 MPT, DPT, is co-writer and co-producer of *MotherFreakingHood!*, an "irreverent, original musical comedy following three unlikely — and uncensored — friends as they take

on the world from pregnancy tests to empty nests...one bottle at a time!" BroadwayWorld describes the show as "...without a doubt the funniest musical comedy of the theater season." The musical closed its most recent run on June 11, 2023 at the Mercury Theater's Venus Cabaret in Chicago.



NORTHWESTERN UNIVERSITY FEINBERG SCHOOL OF MEDICINE
ALUMNI WEEKEND 2024 | THURSDAY-SATURDAY | APRIL 18-20

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In Memoriam

Northwestern Medicine expresses its condolences to the families and friends of the following alumni (listed in order of their graduation year) and faculty who have passed away. All dates are in 2023.

ALUMNI

Byron E. Truax, '51 DDS

March 4
HOUSTON, TX

Dean D. Baker, '52 DDS

January 23
MARSHALLTOWN, IA

Robert A. Schnell, '54 DDS

January 26
ARLINGTON HEIGHTS, IL

David W. Bohn, '56 DDS

January 5
SANTA BARBARA, CA

G. Stephen Scholly, '56 MD

January 23
GLENVIEW, IL

Thomas H. Casey, '57 MD

February 10
ROCHESTER, NY

Florence C. Jacobsen '58 BSDH

January 6
LOS ANGELES, CA

Barbara Beck, '59 BSDH

March 20
STURGEON BAY, WI

Thomas L. Bruck, '60 DDS

March 1
BOISE, ID

Bernard D. Martin, '60 MD

August 19
ARLINGTON HEIGHTS, IL

**Jadwiga Roguska-Kyts, MD,
'60 GME, '63 GME
(*faculty member)**

January 25
ELMHURST, IL

Alan Lerner, '61 MD

March 21
LAKE FOREST, IL

**Joanne C. Schamberger, '61
BSDH**

March 26
FREEPORT, IL

Riccardo M. Benvenuto, '62 GME

March 23
CHICAGO, IL

Hans W. Jung, '64 DDS, '69 MS

December 27
OLYMPIA, WA

Richard J. Andrews, '68 DDS

March 30
SUN CITY WEST, AZ

Robert M. Weir, '69 MD

January 14
SEDONA, AZ

Sister Shirley Kamentz, '70 CERT

March 5
DUBUQUE, IA

Diane S. Horne, '74 PhD

March 23
LINDENHURST, IL

Leslie A. Pliskin, '74 BSM, '76 MD

February 14
CORVALLIS, OR

Myron L. Powell '74 DDS

January 26
KENNEWICK, WA

Denise Kennedyn '86 CERT

January 10
FOUNTAIN HILLS, AZ

**Reverend Wesley Gene
Robinson-McNeese, '90 MD**

September 18
SPRINGFIELD, IL

FACULTY

**Robert A. Lamb, PhD, professor emeritus,
Microbiology-Immunology**

September 2
EVANSTON, IL



Robert A. Lamb, professor emeritus, department of Microbiology-Immunology at Northwestern University Feinberg School of Medicine, died September 2, 2023. He was 72.

Lamb was an internationally recognized authority on influenza and paramyxoviruses. He made major contributions to the understanding of the molecular

structure and the mechanism of replication of these disease-causing negative-strand RNA viruses. Lamb's research revealed fundamental properties of the virus life cycles that have been crucial to the development of new vaccines and medicines.

"Bob was an integral member of our department, an outstanding scientist and a generous colleague," said Amy Rosenzweig, PhD, the Weinberg Family Distinguished Professor of Life Sciences and chair of the department of molecular biosciences at Northwestern's Weinberg College of Arts and Sciences. "His unwavering enthusiasm for and support of structural biology positively impacted the careers of many in the department, including myself."

Lamb, the Kenneth F. Burgess Professor of Molecular Biosciences in Weinberg College, retired in 2022 from the University after 39 years of service. He also served as chair of the molecular biosciences department and was an investigator of the Howard Hughes Medical Institute (HHMI) since 1991.

"Bob Lamb was an eminent scientist who advanced our understanding of viruses," Provost Kathleen Hagerty said. "He also was dedicated to mentoring young scientists, from undergraduates to postdoctoral fellows, for 40 years. Bob will be missed by many."

Faculty Members Honored at Endowed Professorship Ceremony

On September 18, the Feinberg School of Medicine celebrated 22 faculty recently appointed with endowed professorships during a group investiture ceremony at The Peninsula Hotel in downtown Chicago.

“At Feinberg, our faculty are the single most important resource for advancing the medical school’s key missions of research, education, and clinical service,” says Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, during his opening remarks. “Our shared successes depend upon the intellectual environment created by a superb and committed faculty. For this reason, the creation of named and endowed professorships at the medical school is enormously important.”

These academic accolades help Feinberg to recognize its most distinguished and productive physicians and scientists and recruit and retain leaders in medicine. The medical school currently has more than 220 endowed professorship positions—all made possible by donor support.

During the ceremony, Cecilia Berin, PhD, was invested as the inaugural Bunning Professor of Food Allergy Research. Berin studies the immune basis of allergy and tolerance to foods through high-dimensional analysis of specimens from human cohorts. She is especially interested in understanding the immune basis of treatment response to novel therapies, the immune basis of poorly understood non-IgE-mediated food allergies, and mechanisms responsible for susceptibility to allergic disease in early life.

“We are proud to continue to sponsor food allergy research at Northwestern through the expertise of Dr. Berin,” says Dave Bunning, who along with his wife Denise, also provided philanthropic support for the Center for Food Allergy and Asthma Research (CFAAR), a partnership between the Feinberg School of Medicine and

Ann & Robert H. Lurie Children’s Hospital of Chicago. “We are confident that this new professorship will keep the momentum going in the search for more effective treatments and prevention.”

Francesca Elizabeth Duncan, PhD, and Lynn Yee, ’08 MD, ’08 MPH, were formally recognized as the Thomas J. Watkins Memorial Professors. Serdar E. Bulun, MD, chair of the Department of Obstetrics and Gynecology and the John J. Sciarra Professor of Obstetrics and Gynecology, bestowed ceremonial medallions upon each of them.

Duncan leads a research program focused on understanding the cellular mechanisms of how aging—both physiologic and iatrogenic—impacts reproductive potential at the levels of the gamete and ovary. Most recently, as the principal investigator of the Ovarian Contraceptive Discovery Initiative, Duncan has expanded her research to encompass modulating reproductive capacity through identification of novel targets for non-hormonal contraception in the ovary using innovative models such as *in vitro* follicle growth and ovulation.

“It is truly an honor and privilege to join this accomplished group of faculty as an endowed professor at Northwestern University,” Duncan proclaims. “The Thomas J. Watkins Memorial Professorship will enable me to train the next generation of researchers while pushing the translational boundaries of my laboratory’s research to develop novel therapeutic interventions focused on female reproductive longevity.”



Cecilia Berin, PhD, (left) was invested as the inaugural Bunning Professor of Food Allergy Research. Susan E. Quaggin, MD, chair of the Department of Medicine, director of Feinberg Cardiovascular and Renal Research Institute, and Irving S. Cutter Professor of Medicine (middle), bestowed the ceremonial medallion upon her. Dean Eric G. Neilson, MD, (right) presided.



Feinberg faculty who received endowed professorships.

PAVING THE WAY FOR GREATER DIVERSITY IN MEDICINE

An African American born and raised in a middle-class family, William D. Yates, '85 MD, attended public schools in Chicago throughout his life until being accepted into the six-year Honors Program in Medical Education at Northwestern. It was through his inner-city, public-school education that Yates gained an understanding and tolerance of the world and its diverse inhabitants; the Chicago public school system was a melting pot of cultures that provided students like Yates the opportunity to develop meaningful relationships with people of many races and cultures.

"This experience was critical to my development," Yates explains. "It prevented me from accepting the prevalent stereotypes associated with culture and race, which I found to be terribly inaccurate."

The ability to work with diverse groups of people from a multitude of cultures and ethnicities has assisted Yates in his career, allowing him to pursue a non-traditional medical career path. "I have always had an entrepreneurial spirit, and I'm continuously thinking of simple solutions to seemingly complex problems," Yates says. "My latest project is a patented auto theft anti-carjacking device, and at one time during my career I owned an auto dealership." Yates also developed a patented medical device, the ARTAS Hair restoration robot.

Getting to where he is today wasn't easy, and Yates said much of his success can be attributed to the mentors he worked with at

I have always had an entrepreneurial spirit, and I'm continuously thinking of simple solutions to seemingly complex problems."

Feinberg. Yates's mentors included professor of Orthopedic Surgery James Hill, '70 MD, '79 GME, an African American orthopedic surgeon Yates met during his first year of medical school; renowned neurosurgeon and former associate professor of neurosurgery Leonard Cerullo, MD, '77 GME; and Carl Backer, MD, '85, '87 GME, who served as his general surgery mentor.

Influenced by the surgeons he met during medical school, Yates decided to go into general surgery. "Dr. Hill was a living example of what you could achieve with passion and hard work," Yates says. "And although I ultimately decided to go into general surgery, Dr. Cerullo was very encouraging and enthusiastic about neurosurgery, making the study of something as complex as neurosurgery very understandable and rewarding."

In Backer, who was chief resident at the time, Yates discovered a physician who had a breadth of knowledge, friendly demeanor, good bedside manner, and the ability to simplify complex subjects into concepts that were readily understandable—all traits that he admired and aspired to.

"They [Yates's mentors] all exhibited academic excellence, impeccable technique, timeliness, and always presenting themselves well," Yates says. "All these attributes defined how I practiced medicine."

Although Yates had a robust support team in both Feinberg faculty and fellow students, he did experience adversity when he first began his medical journey. "If I had any adversity in my practice, it would be once I left my trauma fellowship and joined another surgeon who was fresh out of residency," Yates maintains. "Both of us were quite competent, but we did not have the luxury of being experienced as other seasoned surgeons were. We also did not have a sounding board for discussing difficult



cases or surgical assistance in cases that we never encountered during our training."

As a result, Yates advises all students and residents to join a group with mature, seasoned physician leaders so that they can benefit from all their experiences with a myriad of cases that will help them avoid unintentional costly mistakes. "Even though you may be at the end of your fellowship, and you pass all your board certifications and feel pretty good about yourself, believe me: in the real world, there will be situations that you have never contemplated and therefore never treated, but you will be called on to treat these patients," Yates says. "At times like these, it is very comforting to have someone in your corner who has been there and can put you on the right path."

With his diverse background and influences from stellar physicians, Yates says he is able to nurture and advise other students, residents, and new physicians just starting out in the medical field. "The best advice that I can share would be to always maintain your curiosity and always be a student of medicine," Yates urges. "Treat all people equally with respect no matter who they are, avoid unnecessary conflict, be kind to your physician peers, and resist any impulse to be punitive. Lastly, find a seasoned physician to align yourself with because you are never as smart as you think you are."



Left: A depiction of the McKinley assassination.

Above: Willis D. Storer, MD

Right: Roswell Park, MD



1901

Witnesses to History

TWO ALUMNI AND THE MCKINLEY ASSASSINATION

On September 6, 1901, people lined up to shake the hand of President William McKinley at the Pan-American Exposition in Buffalo, New York. Usually, people greeting the president had to do so with an empty, open hand. Because of the heat of the day, many people held handkerchiefs to wipe sweat from their faces, and the rule was not enforced.

Leon Czolgosz, a 28-year-old self-described anarchist, approached McKinley with a small revolver hidden under a handkerchief in his right hand. He shot McKinley twice in the abdomen at point-blank range.

The president was rushed to the exposition's hospital, which was equipped with a rudimentary operating room. The exposition's medical director, Roswell Park, was away at the time. The physician put in charge, Matthew D. Mann, MD, attempted

to find and remove the bullets but only found entry and exit wounds in McKinley's stomach, which he stitched up.

Two Northwestern alumni were present in the operating room with McKinley: Roswell Park, MD, an 1876 graduate of the medical school, and Willis D. Storer, MD, an 1888 graduate.

After receiving his MD, Park completed an internship at Cook County Hospital, where he developed a skill for treating gunshot wounds. He then taught anatomy at the Woman's Medical College of Chicago and Chicago Medical College (the precursor to the Feinberg School of Medicine) for five years before becoming professor of Surgery at the University of Buffalo. He is best known today for founding the Gratwick Laboratory in 1898, which eventually became the Roswell Park Comprehensive Cancer Center.

Park had been appointed the medical director of the 1901 Pan-American Exposition. On the day McKinley was shot, he was 20 miles away in Niagara Falls performing a delicate neck operation. A train was sent to bring him back to Buffalo; on its return trip, it broke the record for the fastest time traveled between the two cities. Unfortunately, Park arrived as the operation was nearly complete. Given his expertise in the treatment of gunshot wounds, many people speculated that the outcome may have been different if he had been there from the beginning.

Willis D. Storer, MD, spent 40 years as a physician in Chicago, including as an attending physician at Maurice Porter Hospital, the precursor to Ann & Robert H. Lurie Children's Hospital of Chicago. He moved to Los Angeles in 1930 and continued his medical practice. Storer attended the Pan-American Exposition as the guest of M. Coney, MD, who oversaw the Paris Incubator Hospital exhibit at the fair. Although accounts differ, it is clear that Storer ended up in the Exposition Hospital that day. In an article for the *Chicago Daily Tribune*, he remarked that all the physicians present agreed that McKinley needed to be operated on and that the usual antiseptic precautions were taken.

For nearly a week, McKinley seemed to be getting better, but he died in the early hours of September 14. A subsequent autopsy revealed that a bullet had passed through his stomach, then through his colon, also damaging his kidney, adrenal glands, and pancreas. Modern scholars generally believe he died of pancreatic necrosis (a sudden inflammation of the pancreas, in this case caused by trauma), which is difficult to treat even with modern medicine and would have been impossible to treat in 1901.

Emma Florio is the special collections library assistant at the Galter Health Sciences Library and Learning Center. To read the full article, visit galter.northwestern.edu.

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