

Spring 2016 Volume 03, Number 02

Northwestern Medicine

A publication for the alumni and friends of Northwestern University Feinberg School of Medicine,
Northwestern Memorial HealthCare and the McGaw Medical Center of Northwestern University

Magazine

p.20

Acceptance for Life

Inducing immune tolerance a potential
game changer for transplant recipients

p.16

Heart health
important at all ages

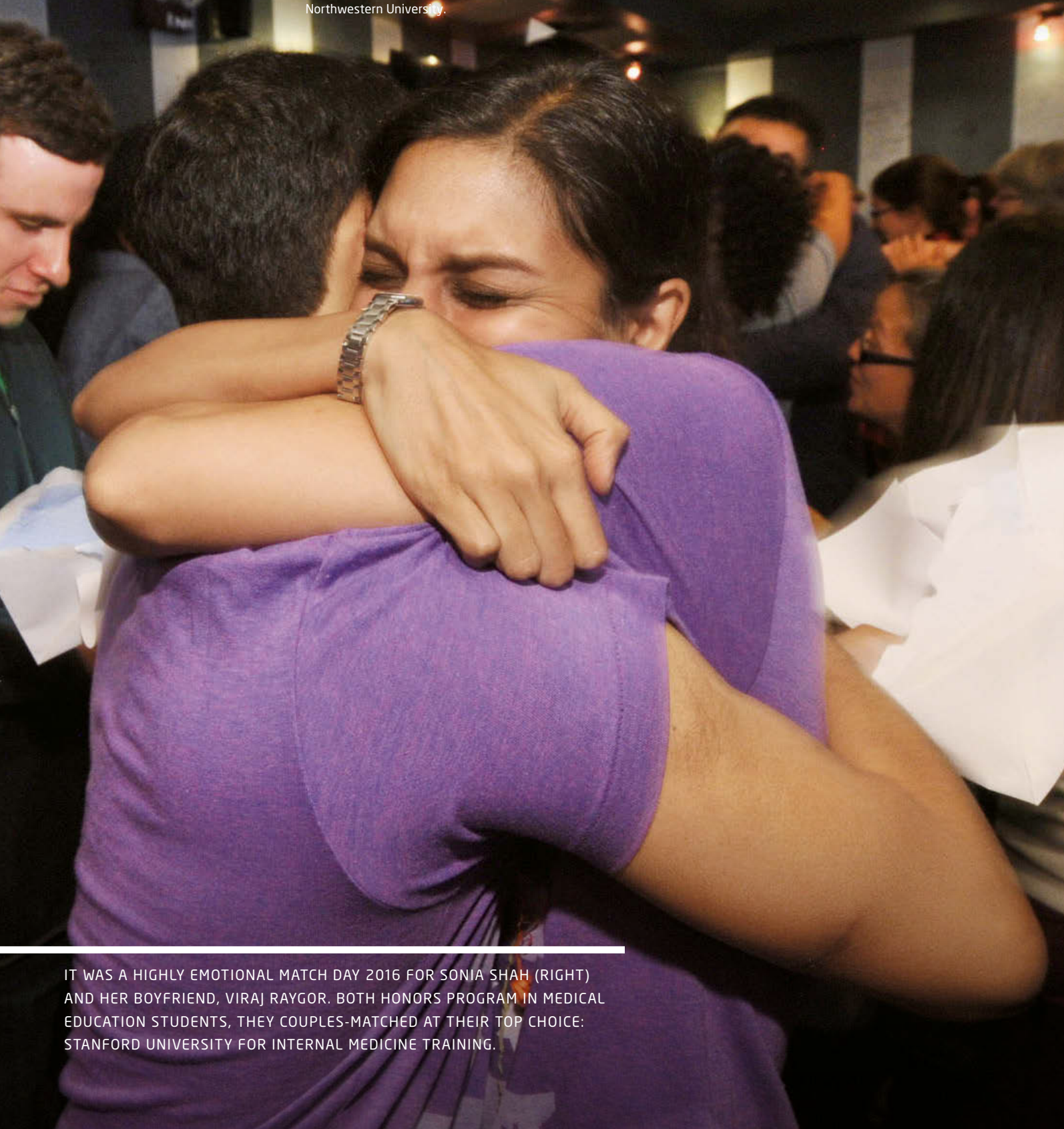
p.24

Aiming high for
rheumatology

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IT WAS A HIGHLY EMOTIONAL MATCH DAY 2016 FOR SONIA SHAH (RIGHT) AND HER BOYFRIEND, VIRAJ RAYGOR. BOTH HONORS PROGRAM IN MEDICAL EDUCATION STUDENTS, THEY COUPLES-MATCHED AT THEIR TOP CHOICE: STANFORD UNIVERSITY FOR INTERNAL MEDICINE TRAINING.

Northwestern Medicine

SPRING 2016

Magazine

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INSIDE FRONT COVER
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ADDITIONAL
PHOTOGRAPHY
Randy Belice: p. 05
Nathan Mandell:
pp. 03, 27-29
Bruce Powell: pp. 24, 27

DESIGN
Firebelly Design

- 02 Northwestern Medicine Leadership Message
Leaders at Nurturing Future Leaders in Medicine

Campus News

- 03 Alumna Supports Global Health
- 04 March 'Matchness' Strikes Feinberg
- 06 Faculty Awards and Honors
- 08 Northwestern Awards First Nemmers Prize in Medical Science
- 09 Feinberg Reaches All-Time High in Rankings
- 10 Research Briefs
- 14 Media Spotlight

16 Features

Ward Rounds (Alumni) News

- 28 Alumni Board President's Message
- 29 Alumni Weekend 2016
- 32 Progress Notes
- 36 Progress Notes Awards/Honors
- 38 One Vertebra at a Time
- 40 In Memoriam and Upcoming Events



ACCEPTANCE FOR LIFE

Innovative cell-based approaches induce immune tolerance in kidney transplant recipients

P.20



COVER ART: Donated kidney tissue illustrated using a faux-stereoscopic effect. Feinberg faculty are exploring exciting strategies to prevent organ transplant rejection – without toxic immuno-suppressive drugs.

YOUNG AT HEART

Heart health at all ages central to Women's Cardiovascular Health Program

P.16

AIMING HIGH

From post-doc to division chief, new head of rheumatology makes big plans

P.24

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Northwestern Medicine Leadership



Spring is a season of great excitement and expectation for academic medicine. Annually, on the third Thursday in March, fourth-year medical students across the country tear open envelopes to discover where they have matched for the next three to seven years of residency training. It's a life-changing moment many Northwestern alumni remember fondly.

For Feinberg students and their mentors, Match Day represents the culmination of years of hard work and dedication. Again this year, our students performed exceedingly well: more than 60 percent of Feinberg students matched at hospitals affiliated with top 25 medical schools as ranked by *U.S. News & World Report*.

This stellar graduating class of medical students was the first to spend all four years in our innovative and redesigned curriculum, first introduced in 2012. Meeting the needs of the ever-changing healthcare landscape, our approach to medical education emphasizes active learning in small groups, early and regular exposure to clinical activities, including our groundbreaking Education-Centered Medical Home clinic, and mentored research activities for all students.

For our academic health system, the opportunity to welcome new residents from

across the country invigorates, particularly as Northwestern Medicine expands and offers new postgraduate training opportunities. Through the McGaw Medical Center of Northwestern University, more than 1,100 physicians complete their graduate medical education as residents annually. Of our incoming 2016 residents, 35 percent graduated from a top 25 medical school, and 20 percent are members of Alpha Omega Alpha, the national medical honor society.

These talented residents will work at Northwestern Memorial Hospital or one of seven other affiliated institutions. The most recent addition to that list is Lake Forest Hospital, in Northwestern Medicine's North Region, where this year the first round of residents took part in the North Region's family residency program. A major benefit of the continued expansion of our academic health system is that we can continue to offer unmatched education and training activities to our students and trainees in a variety of settings.

A strong and diverse residency system is essential to ensuring enough physicians are available to meet future needs of the population. As our nation faces an increasingly difficult funding environment for physician training, we are advocating

to preserve current at-risk residency funding levels and to increase the total number of residency spots nationwide. We are also doing our part to support graduate medical education above the 20-year old federal funding cap on Medicare-funded residency positions. Supporting these unfunded positions comes at enormous cost, but we know the communities we serve depend on the exceptional care provided by our residents.

As an integrated academic health system, outstanding educational and research opportunities abound alongside world-class clinical care provided by Northwestern Medicine's dedicated physicians, nurses and staff. It's no wonder that *U.S. News & World Report* recently ranked Feinberg 17th in the list of the nation's best medical schools, and three Northwestern Medicine hospitals were included on the *U.S. News* list of America's Best Hospitals.

Whether it's the brilliant minds in our MD, Physician Assistant and Physical Therapy programs, the hard-working trainees in our residency and fellowship programs or our innovative graduate students pushing the boundaries of science and medicine in our basic science departments, it's clear Northwestern Medicine continues to be a destination for the future leaders of medicine.

With warm regards,

Eric G. Neilson, MD
Vice President for Medical Affairs and Lewis
Landsberg Dean, Northwestern University
Feinberg School of Medicine

Dean M. Harrison
President and CEO
Northwestern Memorial HealthCare

Campus News



Alumna Supports Global Health

Betty Hahneman Kolb, '52 MD, '56 GME, has remained closely connected with her alma mater since graduation. In 2013, she established the Betty M. Hahneman, MD, MPH, Scholarship at the medical school. Most recently, she began supporting global health education, making gifts to the Global Health Initiative Fund and, in 2015, committing \$100,000 to establish the first ever fully endowed student and resident travel fund at Northwestern.

"I would like to have any medical student who wishes to do so be able to participate in a global health assignment by traveling to a location where observation and participation in healthcare activities will offer a unique and valuable learning experience," says Hahneman Kolb.

Since 2008, the Center for Global Health has enabled nearly 700 Feinberg medical students and residents to serve in 38 different low-resource countries around the world. Thanks to Hahneman Kolb's gift, the Global Health Experience Fund will support the participation of two to three students and residents each year.

"The new endowment will make it possible for Feinberg trainees to pursue global health clinical training opportunities in low-resources settings with underserved patient populations that often have meaningful impacts on their careers," says Dan Young, MPA, the center's deputy director. "Our students are truly appreciative of the unique opportunities and support these gifts offer, a combination that is not commonly available at other medical schools in the United States." **M**

Advancing Heart Valve Care

The IDP Foundation, Inc. recently made a generous commitment to support the Heart Valve Disease Research Program in the Center for Cardiovascular Innovation within the Division of Cardiology at Feinberg. This crucial philanthropy will establish a cardiovascular imaging center and advance projects focused on improved outcomes in aortic stenosis through multimodality cardiovascular imaging, basic research and clinical application.

The IDP Foundation's partnership will accelerate research and advance care for patients by ensuring that Feinberg faculty have the resources to continue developing groundbreaking approaches for individuals living with heart valve disease.

A private non-profit organization, the IDP Foundation is dedicated to encouraging and supporting the development of innovative and sustainable solutions to complex global issues. **M**

Choi Named Freinkel Professor

Jaehyuk Choi, MD, PhD, was invested as the inaugural Ruth K. Freinkel, MD, Research Professor at Northwestern University Feinberg School of Medicine on April 4. Dr. Choi's colleagues, friends, family and alumnus Eugene A. Bauer, '67 MD, and his wife, Gloria, celebrated his investiture ceremony at the Ritz-Carlton Chicago.

In 2010, the Bauers established the endowed Freinkel Professorship to recognize the lifetime achievements of Ruth Kimmelstiel Freinkel, MD. For 34 years, she served on the faculty of the Department of Dermatology and was its first full-time faculty member. She passed away in 2014. In addition to his named professorship, Choi is an assistant professor of Dermatology and of Biochemistry and Molecular Genetics at Feinberg. **M**



JAEHYUK CHOI (LEFT), MD, PHD; HIS WIFE, JENNIFER CHOI, MD, ASSOCIATE PROFESSOR OF DERMATOLOGY; AND GLORIA AND EUGENE BAUER, '67 MD

March 'Matchness' Strikes at Feinberg

WRITTEN BY: Sarah Plumridge

PHOTOGRAPHY BY: Randy Belice

See the Match Day 2016 video and slideshow online at magazine.nm.org.



By the Numbers

% OF TOP SPECIALTIES CHOSEN BY FEINBERG STUDENTS

% OF TOP STATES FOR TRAINING CHOSEN BY FEINBERG STUDENTS

On March 18, the third floor of Gino's East in Chicago was filled with excitement and nervousness as well as 148 fourth-year medical students, their families, friends and faculty mentors.

The students had gathered together to tear open their Match Day envelopes and learn where they will attend residency training for the next three to seven years. They also celebrated the success of their four-year journey at Feinberg.

"I'm grateful for all of my friends and family. I'm happy to see classmates I haven't seen in a while, and it's nice for all of us to come together at the end," says Michael Okoli, a fourth-year medical student who matched at Thomas Jefferson University in Philadelphia in orthopaedic surgery.

Every year, Match Day is held on the third Friday of March at the same time, at medical schools across the country. This year's match was the largest on record, encompassing 42,370 registered applicants and 30,750 positions, according to the National Resident Matching Program (NRMP).

This is the culmination of a long relationship, and I'm excited to see how all of the tools and skills I learned here will help me in this next stage.

Prajwal Ciryam, an MD/PhD student in the Medical Scientist Training Program and an alumnus of the Weinberg School of Arts

and Sciences, was eager to learn where he matched.

"I've been at Northwestern for a long time and am very grateful to this institution," says Ciryam. "This is the culmination of a long relationship, and I'm excited to see how all of the tools and skills I learned here will help me in this next stage."

During his time at Northwestern, Ciryam studied how protein misfolding leads to the neurodegenerative disorders in a molecular biosciences laboratory. He was also Fulbright scholar at the University of Cambridge. He matched at New York-Presbyterian Hospital at Columbia University Medical Center in New York City in neurology.

Conducted by the NRMP, matches are made by using a computerized mathematical algorithm to align the preferences of applicants with the preferences of residency program directors to fill the training positions available in U.S. teaching hospitals.

"I matched at Northwestern for orthopaedic surgery, my number one choice," says Danielle Chun, a fourth-year medical student, who spent the past year conducting orthopaedic research. "Without the mentorship and encouragement of the orthopaedic faculty at Northwestern, I would not be in this position. I'm so grateful and excited to have the opportunity to continue my orthopaedic training at Northwestern for the next five years." **M**

61.9% Percentage of Feinberg students who matched at residency programs associated with the Top 25 U.S. News-ranked medical schools in 2016.

22.4%

Internal Medicine

8.8%

Pediatrics

8.2%

Emergency
Medicine

7.5%

Obstetrics &
Gynecology

6.8%

Anesthesiology

6.8%

Orthopaedic Surgery

35.4%

Illinois

15%

California

12.9%

New York

8.8%

Massachusetts

5.4%

Pennsylvania



MATCH DAY 2016 REVEALED WHERE FOURTH-YEAR MEDICAL STUDENTS ACROSS THE COUNTRY AND AT THE FEINBERG SCHOOL OF MEDICINE WILL BE SPENDING THE NEXT SEVERAL YEARS FOR THEIR SPECIALTY TRAINING. FAMILY, FRIENDS AND MENTORS HELPED STUDENTS CELEBRATE THE MOMENTOUS OCCASION.

Faculty Awards and Honors



THE NEW *JOURNAL OF GLOBAL ONCOLOGY* WILL BENEFIT FROM THE EXPERTISE OF WILLIAM GRADISHAR, MD.

William Gradishar, MD, Betsy Bramsen Professor of Breast Oncology and director of the Maggie Daley Center for Women's Cancer Care, has been appointed to the editorial board of the American Society of Clinical Oncology's new *Journal of Global Oncology* (JGO). The publication was founded to address cancer care, research and care delivery issues unique to countries and settings with limited healthcare resources. JGO published the first issue of the online-only, open-access journal in September.

John Kalapurakal, MD, professor of Radiation Oncology and of Neurological Surgery, was named chair of the Children's Oncology Group's (COG)

Radiation Oncology Discipline Committee. A National Cancer Institute-supported clinical trials group, COG is the world's largest



organization devoted exclusively to childhood and adolescent cancer research.

Shohreh Shahabi, MD, was formally invested as the John and Ruth Brewer Professor of Gynecology and Cancer Research. Shahabi is chief of the Division

of Gynecologic Oncology in the Department of Obstetrics and Gynecology. She also serves as program director for the gynecologic oncology fellowship program at Feinberg and on the executive committee for the Lurie Cancer Center.



The American Society of Transplant Surgeons (ASTS) awarded **Jason Wertheim, MD, PhD**, assistant professor of Surgery in the Division of Organ Transplantation, the 2016 ASTS Vanguard Prize for his paper entitled, "Optimization and Critical Evaluation of Decellularization Strategies to Develop Renal Extracellular Matrix Scaffolds as Biological Templates for Organ Engineering and Transplantation."

Yongchao Ma, PhD, assistant professor of Pediatrics in the Division of Developmental Biology, of Neurology and of Physiology, received a five-year, \$1.5 million grant from the National Institute of Neurological Disorders and Stroke to explore a novel mechanism regulating mitochondrial functions. Ma's research focuses on how dysregulation of this mechanism leads to mitochondrial oxidative stress and motor neuron degeneration in spinal muscular atrophy.



Chad Mirkin, PhD, George B. Rathmann Professor of Chemistry in the Weinberg College of Arts and Sciences, professor of Medicine and director of Northwestern's

International Institute for Nanotechnology, was awarded the inaugural \$400,000 Raymond and Beverly Sackler Prize in Convergence Research from the National Academy of Sciences. This year's prize recognized convergence research that benefits human health.

Mirkin was also one of three awarded the 2016 Dan David Prize, in the Future Time dimension, for his trailblazing breakthroughs in nanoscience.

The international Dan David Prize, headquartered at Tel Aviv University, annually awards three \$1 million prizes for outstanding achievements in the three time dimensions – past, present and future.

Brian Mitchell, PhD, assistant professor of Cell and Molecular Biology, received the Nikon Fellowship from the Marine Biology Laboratory Woods Hole, Massachusetts, to advance his research on the development of multi-ciliated cells – cells with small, hair-like protrusions – using microscopy.

His lab uses the embryonic skin of the xenopus frog to study molecular processes required to form multi-ciliated tissue. Ciliated tissues are important for functions such as clearing mucous away from the lungs. Understanding the structures used in the development of ciliated cells may provide insights into how cell replication goes awry in cancer growth.

Monique Hinchcliff, MD, assistant professor of Medicine in the Division of Rheumatology, was recently awarded a Resident Research Preceptorship on behalf of the



Rheumatology Research Foundation, affiliated with the American College of Rheumatology. Preceptorships encourage students and residents to learn more about rheumatology and pursue careers in the field by supporting one-on-one, real-world learning experiences.

Five professors associated with Northwestern Medicine and the Northwestern Engineering's Department of Biomedical Engineering were inducted into the American Institute for Medical and Biological Engineering's College of Fellows. They include:

- » **Chad Mirkin, PhD**, professor of Medicine, cited for his outstanding contributions to nanomaterials engineering, development and application widely used both academically and commercially as diagnostic and therapeutic agents
- » **Samuel Stupp, PhD**, professor of Medicine in the Division of Endocrinology, Metabolism and Molecular Medicine, and director of the Louis A. Simpson and Kimberly K. Querrey Institute for BioNanotechnology in Medicine, cited for the development of bioactive and self-assembling supramolecular biomaterials for regenerative medicine
- » **Todd Kuiken, MD, PhD**, professor of Surgery and of Physical Medicine and Rehabilitation, and associate dean for Hospital Academic Affairs at the Rehabilitation Institute of Chicago, cited for seminal contributions to the field of bionic medicine, including the development and clinical deployment of targeted muscle reinnervation
- » **Lee Miller, PhD**, professor of Physiology and of Physical Medicine and Rehabilitation, cited for outstanding contributions to the neuroscience and engineering involved in the development of brain-machine interfaces for the control of movement
- » **Richard Van Duyne, PhD**, Charles E. and

Emma H. Morrison Professor of Chemistry in the Weinberg College of Arts and Sciences, cited for his contributions to the field of Raman spectroscopy and pioneering applications of surface enhanced Raman spectroscopy to biology and medicine

The Department of Otolaryngology – Head and Neck Surgery recognized the outstanding achievements of two faculty members in January: **Harold Pelzer,**



MD, DDS, associate professor emeritus of Otolaryngology, received the 2015 Faculty Excellence in Surgical Teaching and Mentoring Award and **Stephanie Smith, MD**, assistant professor of Otolaryngology, the 2015 Faculty Excellence in Clinical Teaching and Mentoring Award.

The Robert H. Lurie Comprehensive Cancer Center of Northwestern University recently announced the recipients of the 2016 Liz and Eric Lefkofsky Innovation Research Awards. Funded by a \$1 million donation from Liz and Eric Lefkofsky to further the study of oncology treatment, the awards were established to provide Lurie Cancer Center investigators with the resources to conduct innovative cancer-relevant pilot studies that can serve as foundations for larger, nationally-funded studies.

Based on the outstanding progress made during their initial year of funding, two awardees from 2015 received funding to continue their projects for a second year. Two additional investigators received 2016 Innovation Research Awards that will support new pilot projects.

The new Liz and Eric Lefkofsky Scholars are **Vadim Backman, PhD**, professor of Biomedical Engineering, McCormick School

of Engineering, for "Chromatin protection therapy: A new paradigm to combat cancer chemoresistance" and **Ali Shilatifard, PhD**, chair and professor of Biochemistry and Molecular Genetics, for "Transcription elongation control in cancer therapeutics."

Renewal funding went to 2015 Liz and Eric Lefkofsky Scholars **Laura Lackner, PhD**, assistant professor of Molecular Biosciences, Weinberg College of Arts and Sciences, for "Identifying new ways to inhibit mitochondrial division, a process essential for cancer cell proliferation and metastasis" and **Athanasios Vasilopoulos, PhD**, assistant professor of Radiation Oncology, for "Acetylation of KRAS lysine 147 is a novel oncogenic post-translational modification directed by SIRT2."

Jonathan Fryer, MD, professor of Surgery in the Division of Organ Transplantation, has been appointed the Richard H. Young Professor.



FAME members **Bill Healey, PT, EdD**, assistant professor of Physical Therapy and Human Movement Sciences and **Babette Sanders, DPT**, associate professor of Physical Therapy and Human Movement Sciences, were recently recognized with teaching awards from the American Physical Therapy Association. Healey received the Distinguished Educator Award for excellence in teaching and Sanders, the Award for Leadership in Education (the highest honor given by the professional group's Education Section).

Northwestern Medicine physicians made a strong showing in a variety of specialty areas in the "Top Doctors 2016" list recently published by *Chicago Magazine*. To view the complete list, visit magazine.nm.org. **IM**

Northwestern Awards First Nemmers Prize in Medical Science

WRITTEN BY: Nora Dunne

Huda Zoghbi, MD, a Howard Hughes Medical Institute investigator and professor at Baylor College of Medicine known for her groundbreaking research on Rett syndrome and other neurological disorders, is the inaugural recipient of the Mechthild Esser Nemmers Prize in Medical Science.

Awarded early this year, the Nemmers prize carries a \$200,000 stipend. The honor is bestowed upon a physician-scientist whose body of research exhibits exceptional achievement in his or her discipline as demonstrated by works of lasting significance. A jury of distinguished scientists from around the country made the final selection.

Zoghbi, a professor of pediatrics, molecular and human genetics, and neurology and neuroscience at Baylor, as well as director of the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital, has devoted her career to uncovering the genetic roots of rare neurodegenerative and neurodevelopmental diseases.

"The Nemmers Prize in Medical Science recognizes an outstanding investigator whose discoveries have significantly contributed to improving human health beyond the individual patient," says Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean at Feinberg. "Huda is a superb physician-scientist who has transformed the way we think about the genetic determinants and mechanisms of diseases. We are privileged to honor her with this inaugural award and for her to share her work with us."

In connection with this award, Zoghbi will deliver a public lecture and participate in other scholarly activities at Feinberg in the coming year.

"It is a tremendous honor to be the inaugural Nemmers Prize recipient in Medical Science and to have the opportunity to share my research with the stellar community of Northwestern University," says Zoghbi. "It is truly humbling to be rewarded for what I love to do."

ACCOMPLISHED INVESTIGATOR

One of Zoghbi's earliest major discoveries, in collaboration with Harry Orr, PhD, was the first genetic mutation behind a spinocerebellar ataxia, a hereditary and often fatal brain disorder that impairs a patient's ability to control movement. In later work, she found that a gene called *Math1* plays an important role in the formation of neurons in the brain's cerebellum and spinal cord involved in balance and proprioception (awareness of the position of one's body), inner ear hair cells critical for hearing, as well as brainstem neurons essential for breathing, balance and hearing. Her lab showed that uncontrolled growth of the cerebellar neurons



ZOGHBI STUDIES NEURODEGENERATIVE DISEASES SUCH AS SPINOCEREBELLAR ATAXIAS (SCAs), AN INHERITED DISORDER CAUSING LOSS OF BALANCE AND COORDINATION. THIS IMAGE (BACKGROUND) DEPICTS ABNORMAL CEREBELLAR PURKINJE CELLS FROM A MOUSE MODEL OF SCA TYPE 1.

contributes to brain tumors — removing the gene stops tumors from developing.

She also identified *MECP2* as the gene responsible for Rett syndrome, a neurological disorder that affects brain development, leading to severe problems with cognitive and motor functions. As the first to prove that the disease is genetic, her work opened up a new line of research on mutations that cause neuropsychiatric disorders such as autism.

The Nemmers Prize in Medical Science is the fourth Nemmers Prize to be established by Northwestern University due to a generous gift from the late Erwin Esser Nemmers and the late Frederic Esser Nemmers. It joins the Erwin Plein Nemmers Prize in Economics, the Frederic Esser Nemmers Prize in Mathematics and the Michael Ludwig Nemmers Prize in Music Composition. **NM**



Feinberg Reaches All-Time High in Rankings

WRITTEN BY: Nora Dunne



Feinberg has risen two spots to rank 17th among the best research-oriented medical schools in the country, according to the latest *U.S. News & World Report* rankings announced in mid-March.

"This year's ranking recognizes Feinberg's exceptional accomplishments and our upward trajectory among the nation's elite medical schools," says Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean. "The outstanding achievements of our faculty, trainees, students and staff continue to reinforce our reputation for academic excellence and leading-edge research."

This is the ninth year in a row Feinberg has placed as a top 20 research-oriented medical school, and this year's ranking represents an all-time high.

Three of Feinberg's specialty programs also rated highly, with Pediatrics ranked 14th, Women's Health ranked 10th and Internal Medicine ranked 17th. Feinberg's Department of Physical Therapy

and Human Movement Sciences was also ranked 6th in the listing of best physical therapy programs in the country.

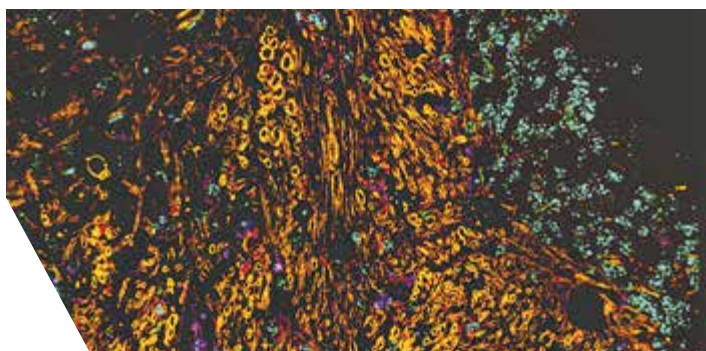
U.S. News assessments are compiled based on peer surveys completed by deans and senior faculty, National Institutes of Health research activity, student selectivity and faculty resources. All 140 fully accredited medical schools and 30 schools of osteopathic medicine in the United States were surveyed.

Feinberg also moved up in this year's *U.S. News* ranking of the best medical schools for primary care, rising 12 spots to 17th. That list factors in the proportion of graduates who enter primary care residencies, rather than research activity.

During the 2015-16 academic year, Feinberg enrolled 638 medical students, 879 PhD students and research fellows, 647 master's and professional program students and 1,135 residents and fellows. Last year, Feinberg scientists received \$402.7 million in funding for research. **M**

"This year's ranking recognizes Feinberg's exceptional accomplishments and our upward trajectory among the nation's elite medical schools."

Research Briefs



MS May Begin from the Inside Out

Multiple sclerosis (MS) may be triggered by the death of oligodendrocytes, brain cells that make myelin (the insulation around nerve fibers), reports a new study from Northwestern Medicine and the University of Chicago. A specially developed nanoparticle prevented MS even after the death of those brain cells, an experiment in the study showed.

Detailed in *Nature Neuroscience*, the study demonstrates the possibility that MS can begin from the inside out. This hypothesis suggests that when oligodendrocytes are damaged, causing myelin to fall apart, the products of its degradation enter the immune system as foreign bodies or antigens. The immune system then erroneously views them as invaders and begins a full-scale attack on myelin, initiating MS. The oligodendrocytes can possibly be destroyed by developmental abnormalities, viruses, bacterial toxins or environmental pollutants.

The scientists developed the first mouse model of the progressive form of MS for the testing of novel drugs. Also in the study, nanoparticles creating tolerance to the myelin antigen were administered and prevented progressive MS from developing. The nanoparticles are being developed for clinical trials that could lead to innovative treatments for adults – without the side effects of current therapies.

"We're encouraged that immune tolerance induced with nanoparticles could stop disease progression in a model of chronic MS as efficiently as it can in progressive-relapsing models of MS," says one of the lead investigators, Stephen Miller, PhD, Judy Guggenheim Research Professor of Microbiology-Immunology and director of the Interdepartmental Immunobiology Center.

An estimated 400,000 people in the United States and 2.5 million worldwide have MS. Of those with long-standing disease, 50 to 60 percent have progressive MS. **M**

The research was supported by grants from the Myelin Repair Foundation and the National Multiple Sclerosis Society.



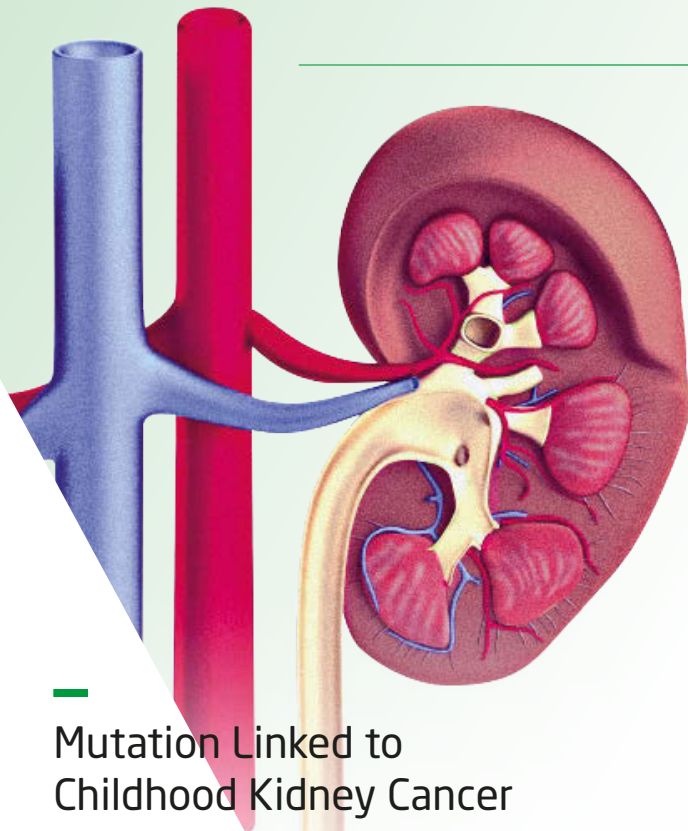
Ancient Family History Influences Disease Risk

When the ancestors of modern humans migrated from Africa to Europe and Asia, they encountered Neandertals (also spelled "Neanderthals"). Though this ancient human subspecies became extinct some 40,000 years ago, humans today contain a small fraction of their DNA as a result of interbreeding. Now research, described in the February issue of *Science*, shows how that DNA has affected our risk for disease.

A team of investigators, including Rex Chisholm, PhD, vice dean of Scientific Affairs and Graduate Education, and Adam and Richard T. Lind Professor of Medical Genetics, assessed the effects of inherited Neandertal DNA on health-related traits in 28,416 modern-day adults of European ancestry. Analyzing the electronic health records of patients with whole-genome sequence data, the team discovered that Neandertal genes contribute to risk for depression, skin lesions and a number of other traits.

Chisholm conducted the study as a member of the Electronic Medical Records and Genomics (eMERGE) Network, a consortium that combines patient genetic data from EHR systems across the United States. **M**

The eMERGE Network is funded by the National Human Genome Research Institute through the following grants: U01HG004438 to Johns Hopkins University; U01HG004610 and U01HG006375 to Group Health Cooperative and the University of Washington at Seattle; U01HG004608 and 1K22LM011938 to the Marshfield Clinic; U01HG006389 to the Essentia Institute of Rural Health; U01HG04599 and U01HG006379 to the Mayo Clinic; U01HG004609 and U01HG006388 to Northwestern University; U01HG04603, U01HG006378 and U01HG006385 to Vanderbilt University; U01HG006382 to the Geisinger Clinic; and U01HG006380 to the Mount Sinai School of Medicine.



Mutation Linked to Childhood Kidney Cancer

Mutations of genes uniquely active in the developing kidney appeared to be connected to the most common type of pediatric kidney cancer, Wilms tumor.

A team led by Elizabeth Perlman, MD, professor of Pathology and head of the Department of Pathology and Laboratory Medicine at the Ann & Robert H. Lurie Children's Hospital of Chicago, discovered a new genetic mutation in the *MLLT1* gene. Perlman's work, published in *Nature Communications*, describes for the first time this specific type of mutation and its significance.

During early development, the gene is a critical component of transcription, the first step in gene expression.

In the study, the scientists sequenced DNA from tumor specimens collected from patients before therapy. Their analysis showed that the *MLLT1* mutation changed gene expression and protein binding to certain chromatin markers, suggesting that *MLLT1* abnormalities occurring early in kidney development lead to Wilms tumor.

The finding adds to previous work from Perlman's group demonstrating that mutations in the *SIX1/2*, *DGCR8* and *DROSHA* genes are associated with this childhood cancer.

"The *MLLT1* mutations result in tumors at a younger age and with different features than those resulting from *DROSHA* and *DGCR8* mutations," says Perlman. "All three of these genes are part of the basic cellular machinery that regulates critical aspects of regulation of messenger RNA expression."

The work is part of ongoing collaborations with the National Institutes of Health's (NIH) National Cancer Institute to identify genetic changes that lead to the development of Wilms tumors. Pinpointed mutations found through these efforts may represent new targets for therapies to help young patients. **M**

The research was funded by NIH grants U10 CA98543, U10CA42326, U10CA98543, U24 CA114766 and U01CA88131, the IDP Foundation, the American and Lebanese Syrian Associated Charities of St. Jude and the King Abdullah University of Science and Technology.



Pot 'Tourists' Landing in Colorado ERs

Out-of-towners using marijuana in Colorado – which has legally allowed sales of the drug in retail dispensaries since 2014 – are ending up in the emergency room (ER) at an alarming rate, reports a North-western Medicine and University of Colorado study that appeared in the February edition of the *New England Journal of Medicine*.

Most patients went home after a few hours, but some were admitted for further observation.

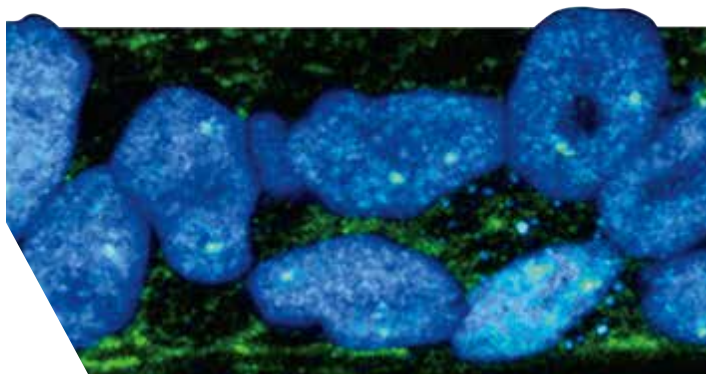
Adverse effects of marijuana use may include psychiatric symptoms such as anxiety, hallucinations and altered mental status; cardiovascular symptoms such as a fast heart rate, high blood pressure or palpitations; and gastrointestinal symptoms including abdominal pain and vomiting.

Although the investigators did not study if the patients used primarily edible or smoked cannabis products, edibles often have a delayed effect, which could lead to overdosing. In addition, the content of edible products is highly variable, so users don't realize the potency of what they are eating.

"People eating marijuana products often don't feel any effect immediately, leading them to eat another edible," says lead investigator Howard Kim, MD, a postdoctoral fellow in Emergency Medicine.

ER visits for marijuana-related symptoms for visitors to the "Centennial State" increased 109 percent between 2012 and 2014. Among Colorado residents, the number of marijuana-related visits increased by 44 percent over the same period. The research took place in the University of Colorado Hospital's emergency department. **M**

Research Briefs Continued



Exploring the Architecture of the Genome

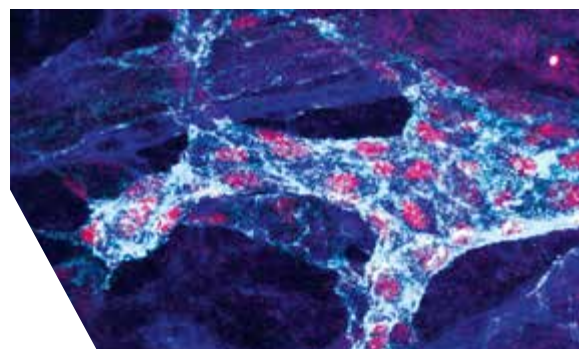
The organization of genetic material within the nucleus of a cell may help explain how that material influences cell function, according to research detailed in the March issue of *Proceedings of the National Academy of Sciences*.

"Genes that are being expressed tend to come closer together physically in the nucleus, and there have been a lot of hypotheses about what this means," says Steven Kosak, PhD, assistant professor of Cell and Molecular Biology and a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

Kosak was interested in seeing whether topologically associated domains (TADs) — genetic material located close together — could provide additional insight about the location of genetic material and its effect on the regulation of gene expression. His team identified a subset of TADs enriched with muscle-specific genes and demonstrated how their pattern of organization within the nucleus influences the positioning of nearby TADs. Daniel Neems, '16 PhD, a graduate of the Walter S. and Lucienne Driskill Graduate Program, designed a system to learn how these patterns emerge during the formation of muscular tissue.

Kosak has several projects focusing on patterns of genome organization related to disease states. "Many diseases are characterized by deregulation of expression in the cell," he says. "If we could understand better what the different organizations mean, maybe we'd understand better how that cell is becoming deregulated." **M**

This work was funded by National Institutes of Health New Innovatory Award DP2 OD008717-01, National Institute of General Medical Sciences Cellular and Molecular Basis of Disease Training Grant T32 GM08061 and National Cancer Institute Oncogenesis and Developmental Biology Training Grant T32 CA080621.



Blame Defective Lymphatics for Obesity?

Lymphatic vessels normally work to rid the body of waste or other unwanted particles. A recently published study shows, though, that obesity in mice arises as a result. Not only did Northwestern Medicine researchers make this novel discovery, but they also showed a way to "fix" the leaky vessels.

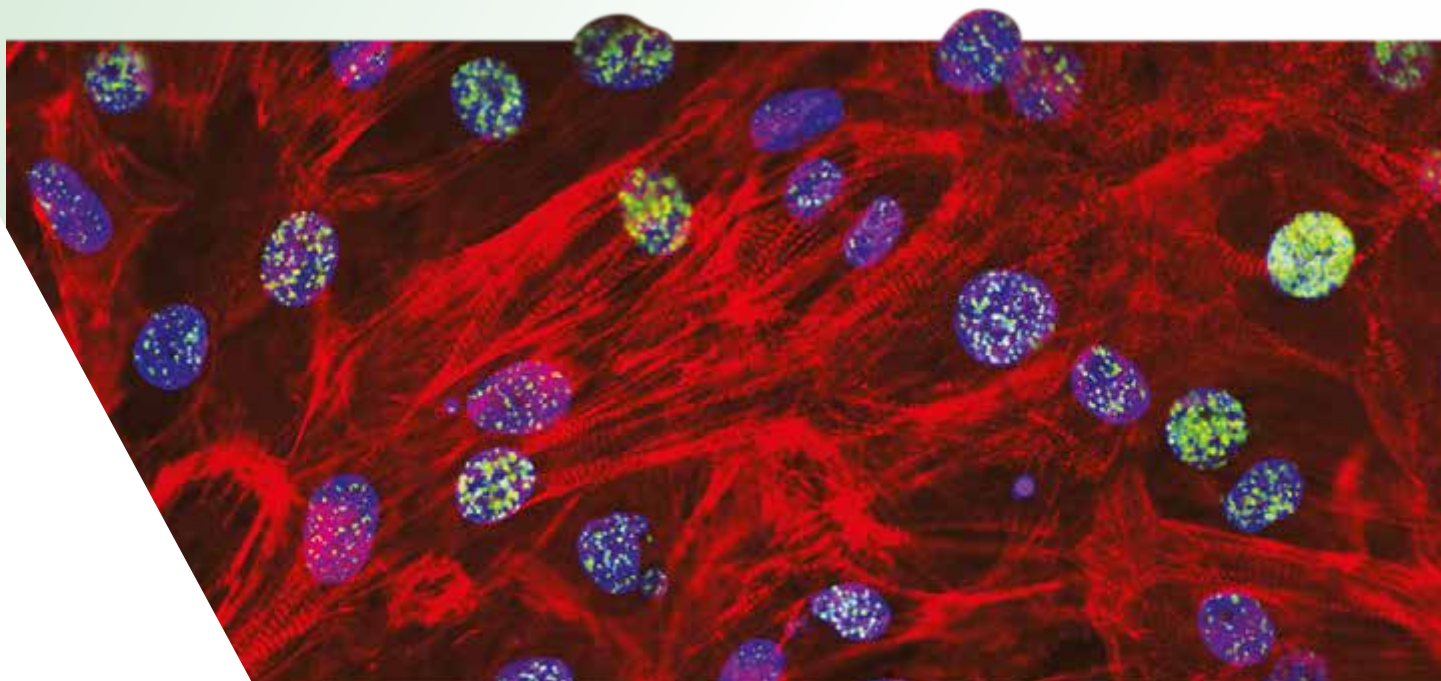
"What is exciting is the restoration of the lymphatic function," says Guillermo Oliver, PhD, professor of Medicine in the Division of Nephrology and lead author of a paper published in the *Journal of Clinical Investigation Insight*. "We didn't know that you could put a gene back and in this case, restore function quite well."

Oliver and his team previously identified that mice with only one copy of the *Prox1* gene, not both, have defective lymphatic vessels that contribute to obesity in adult mice. The scientists discovered when the lymphatic fluid leaked their lipid content from the defective vessels and built up in the surrounding area, it caused an increase in fat tissue.

"These animals are not obese because they eat more or exercise less," says Oliver. "The defects in the mice are because of the defective lymphatics."

In the current study, the investigators compared lymphatic function between young mice (before the onset of obesity) and adult mice. While functional and structural defects in lymphatic vessels are found in younger mice, the severity increases as the mice age and become more obese.

To demonstrate that the lymphatic defects were the unique cause of obesity, the scientists restored normal *Prox1* levels in *Prox1* mutant mouse embryos. This technique brought back lymphatic function and prevented the mice from becoming obese as adults. **M**



Stem Cell Method Fine Tunes Cancer Therapy

Doxorubicin, also known Adriamycin, is used to effectively treat a wide range of cancers, including breast cancer and pediatric leukemia. But for 8 percent of patients, the drug causes cardiotoxicity – heart muscle damage so severe that it can lead to heart failure. Currently, healthcare providers can't predict in advance who will fall into this subset of patients.

Now a study published in the April online issue of *Nature Medicine* has shown that reprogrammed stem cells can be used to identify patients who are likely to experience a dangerous adverse reaction to this common chemotherapy drug.

"We were interested in whether there is a genetic reason for why some patients experience cardiotoxicity," says corresponding author Paul Burrige, PhD, assistant professor of Pharmacology and a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

Since it is difficult to cultivate a patient's heart cells in a lab, Burrige took an alternative route to test the drug: stem cells. First, Burrige and scientists at Stanford University acquired skin cells from patients with breast cancer who were treated with doxorubicin. Some of them developed cardiotoxicity, and some did not. The investigators reprogrammed the skin cells into stem cells.

"We then turned these stem cells into heart muscle cells, treated them with doxorubicin and measured their responses," explains Burrige. "Heart cells from patients who have cardiotoxicity were significantly more sensitive to doxorubicin-induced toxicity. They had more structural damage, reduced contraction, DNA damage and died more easily."

By analyzing gene expression in the cells, the scientists were able to establish genetic differences in drug response. Their work also suggests that mitochondrial dysfunction could be behind the toxic side effect. **M**

This study was supported by National Institutes of Health grants K99/R00 HL121177, R21 HL123655, R01 LM05652, R01 GM102365, R24 GM61374, R01 HL123968, R01 HL126527, R01 HL128170, R01 HL130020, R01 AR063963, R01 AG020961, R21 AG04481501, R01 NS089533; American Heart Association grants 14BGIA20480329, 13POST14480004 and 13EIA14420025; a Dixon Translational Research Grant Young Investigator Award; Muscular Dystrophy Association grant 4320; California Institute of Regenerative Medicine grants IT1-06596, TR3-05501 and RB5-07469; Muscular Dystrophy Association grant 4320; the Baxter Foundation; and a Burroughs Wellcome Fund Innovation in Regulatory Science Award.

Media Spotlight

1 MEN DON'T REALIZE PROSTATE SURGERY RISKS

REUTERS - JANUARY 6, 2016

Men with sexual dysfunction after prostate cancer surgery are often surprised that the surgery put them at risk for problems. Researchers quizzed male patients at a sexual health clinic about the sexual function information they received preoperatively. They found that the men had "largely unrealistic expectations" about their sexual health after the surgery. "This data is some of the first to report what we see in the clinic," says Joshua Meeks, MD, PhD, assistant professor of Urology at Northwestern.

2 HIV HIDING SPOTS REVEAL NEW TARGETS

DAILY MAIL - JANUARY 27, 2016

A new study reports HIV continues to replicate in the body even if it is undetectable in the blood after antiretroviral treatment (ART). The virus "hides" and grows in a viral reservoir within the body's lymphoid tissue. After patients stop taking the potent drugs, the virus "quickly rebounds." Ongoing low levels of HIV replication in the lymphoid tissue appear to maintain the viral reservoirs during ART. Says study author Steven Wolinsky, MD, chief of the Division of Infectious Diseases and Samuel J. Sackett Professor of Medicine at Feinberg, "We now have a path to a cure. The challenge is to deliver drugs at clinically effective concentrations to where the virus continues to replicate within the patient."

3 TRADING ONE ADDICTION FOR ANOTHER

THE DAILY BEAST - FEBRUARY 8, 2016

The National Center on Addiction and Substance Abuse (NCASA) is expanding its focus beyond drugs. The NCASA announced food addiction will become a new, primary area of research. It's a move in the right direction, according to the medical school's Julie Friedman, MD, instructor of Medicine in the Division of General Internal Medicine and Geriatrics. "Food addiction is not taken seriously by health professionals in the way other addictions are." While not a recognizable disorder in the *Diagnostic Statistical Manual of Mental Disorders*, food addiction shares many of the same criteria with drug addiction, such as intense cravings, failure to fulfill major role obligations, interpersonal problems and use in physically hazardous conditions.

4 ZIKA VIRUS MIGHT PERMANENTLY DAMAGE VISION

CNN - FEBRUARY 11, 2016

Zika may now be linked to serious eye abnormalities that could lead to blindness in Brazilian newborns with microcephaly, according to a study published in *JAMA*. "Over 35 percent of the babies tested showed signs of scarring from an active viral infection in the eye. That's much different from what would be associated with poor eye development in a microcephaly brain," says Lee Jampol, MD, professor of Ophthalmology at the Feinberg School of Medicine, who wrote a corresponding

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JANUARY

FEBRUARY

Achieving the Top 1 Percent of Most Cited Papers

WRITTEN BY: Nora Dunne

Northwestern University ranked 10th among worldwide institutions with the most highly cited researchers, according to an analysis by Thomson Reuters.

Twenty-five Northwestern faculty members appeared on the 2015 list of highly cited researchers. Nine of them have primary affiliations at the Feinberg School of Medicine. The prestigious annual list features scientists and scholars whose articles and reviews led to other authors referencing them in their own work.

Researchers included in the ranking wrote the greatest number of papers that place in the top 1 percent of the most cited papers in their subject field and year of publication.

"These researchers have consistently produced papers that inspire or challenge other researchers, proving their work significant and receiving high citation counts as a result," says Karen Gutzman, impact and evaluation librarian at the Galter Health Sciences Library. "This list is recognition of their exceptional impact on their fields."

Feinberg faculty members on the 2015 highly cited list included:

- » Eileen Bigio, MD, Paul E. Steiner Research Professor of Pathology
- » Robert Bonow, '12 MS, MD, Max and Lilly Goldberg Distinguished Professor of Cardiology
- » David Cella, PhD, chair of Medical Social Sciences
- » Mihai Gheorghiade, MD, professor of Medicine in the Division of

commentary for *JAMA*. Two major scarring patterns were found in the eyes of the babies, potentially affecting their future ability to see.

5 HARMFUL DRUG COMBOS FALL THROUGH CRACKS

CHICAGO TRIBUNE - FEBRUARY 11, 2016

Drug interactions are a hidden epidemic in America. Many interactions involve relatively safe prescription drugs that become dangerous only when taken at the same time. Most patients rely on their doctors to protect them, but studies show that prescribers often are unaware of harmful drug combinations or trust that pharmacists have more expertise. Pharmacists, in turn, tend to respect the discretion of doctors. Training on specific drug interactions in medical schools is lacking because of time constraints and the vast number of hazardous combinations, according to Northwestern's Alfred George Jr., MD, chair and Magerstadt Professor of Pharmacology. "New drugs are hitting the market every day, and clinicians rarely have time to read all the literature on the drugs they prescribe."

6 BRAIN HACKING: HOT-WIRED FOR HAPPINESS?


THE WASHINGTON POST - MARCH 3, 2016

In 2013, the National Institute of Mental Health refocused its research to intensify the hunt for the physiological signs of mental diseases and disorders: the biomarkers that many expect will move the field forward. Already small but significant successes in identifying depression biomarkers had been realized. Northwestern Medicine researchers pinpointed, for example, 11 genetic blood markers that distinguished

teenagers who were depressed from those who weren't. Then in 2014, a Northwestern neurobiologist used molecular markers in RNA — the messengers that carry out the DNA's instructions — to develop a blood test for depression in adults that would confirm a physiological basis for patients' symptoms. "This test brings mental health diagnosis into the 21st century and offers the first personalized medicine approach to people suffering from depression," says test developer Eva Redei, PhD, professor of Psychiatry and Behavioral Sciences and of Physiology at Feinberg.

7 NEWBORNS OF OBESE MOMS SUFFER VITAMIN D DEFICIENCY

SCIENCE DAILY - MARCH 7, 2016

Results from a study published in *PLOS ONE* provide ample evidence higher body mass index in mothers is associated with lower vitamin D levels in their babies. This is a concern, since low vitamin D at birth may be associated with reduced bone mineral density in the long term, as well as increased risk of allergic disease and obesity. Meanwhile, excessive weight in pregnant women has become increasingly common. "Our study suggests that overweight or obesity in pregnancy is linked to lower vitamin D levels in both the mother and the newborn," says Jami Josefson, MD, assistant professor of Pediatrics in the Division of Endocrinology, Metabolism and Molecular Medicine at the medical school. "More research is needed, however, before we can make broad recommendations about the need for greater supplementation of vitamin D for overweight pregnant women." 

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MARCH

- Cardiology and of Surgery in the Division of Organ Transplantation
- » Francis Giles, MD, chief of Hematology/Oncology in the Department of Medicine and deputy director of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University
 - » Philip Greenland, MD, Harry W. Dingman Professor of Cardiology
 - » Stephen Hanauer, MD, Clifford Joseph Barborka Professor of Medicine in the Division of Gastroenterology and Hepatology
 - » Donald Lloyd-Jones, MD, chair of Preventive Medicine and director of the Northwestern University Clinical and Translational Sciences Institute (NUCATS)
 - » Clyde Yancy, MD, Magerstadt Professor and chief of Cardiology in the Department of Medicine

Two professors of Chemistry at Northwestern Weinberg College of Arts and Sciences with joint appointments at Feinberg made the list as well: Chad Mirkin, PhD, professor of Medicine, and Karl Scheidt, PhD, professor of Pharmacology.

Among institutions with multiple highly cited researchers, Northwestern shares its 10th place ranking with the University of Oxford in England, the Massachusetts Institute of Technology in Cambridge and the European Molecular Biology Lab in Heidelberg, Germany.

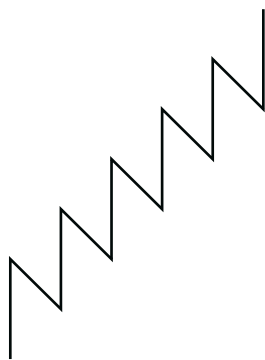
In 2014, Northwestern ranked 14th on the list, according to analysis of the Thomson Reuters data conducted by independent investigators. For the 2015 list, Thomson Reuters calculated the institutional rankings itself.

All analysis is based on papers published and cited in science and social science journals between 2003 and 2013. 



YOUNG AT HEART

At 33 years of age, Shayna Robinson suffered cardiac arrest. In other words, her heart stopped pumping blood. A private-practice physical therapist, Robinson was working with a client one January morning two years ago when she suddenly dropped to the floor unconscious.



Robinson's story might have ended there. People experiencing an "out of hospital" cardiac arrest have a 5 percent chance of survival. The likelihood of avoiding brain damage is even smaller.

But luck, location and a quick response from her client, Barbara, were on her side. When Robinson collapsed, Barbara immediately began chest compressions and continued for 12 1/2 minutes until the paramedics of the Chicago Fire Department – just two blocks away – arrived. They shocked Robinson's heart three times before getting a faint beat. Transported two blocks further to Northwestern Memorial Hospital, she was placed in a medically-induced coma while a team of doctors led by Susan Kim, MD, director of the Cardiac Implantable Electronic Devices Clinic and associate professor of Medicine in the Division of Cardiology, swung into action.

"They did every possible test they could on me and didn't find anything – no structural abnormalities in my heart or risk factors," says Robinson, "I wasn't of a certain age or overweight, and I wasn't doing drugs." What the medical team did know is that she had experienced a ventricular tachyarrhythmia: Her heart had suddenly gone into a rapid, life-threatening rhythm. The team recommended implanting a cardioverter defibrillator to avoid another cardiac arrest.

"I thought about it for about two minutes before agreeing," she says laughing. "My doctors were telling me that I went into ventricular arrhythmia once and died for 12 1/2 minutes. The chance of this happening again was high. If it happened again, my chances of living were even lower, because how lucky can you get more than once?!"

Robinson gives high marks to her doctors and nurses. They provided excellent care and showed great patience in explaining her situation over and over again because of her initial short-term memory problems. "It's no wonder that Northwestern Memorial is one of the best hospitals in the nation," she says. "The cardiovascular team is also honored in that way."

When the time came to diagnose exactly why Robinson's heart had stopped, she underwent an electrophysiology study. The results revealed arrhythmogenic right ventricular cardiomyopathy. "It's a genetic mutation that causes dead zones in your heart so certain

areas won't electrify," she explains. "They start out small and as you get older these abnormal rhythms get stronger. These abnormalities become more and more incongruent until you go into an arrest."

PURPOSEFUL PARTNERING

"...I have this further purpose now. It (the cardiac arrest) was a gift really," continues Robinson. "More than just life, I have the ability to talk to people, especially younger people, about what they should look for — the little signs and symptoms — that I didn't know at the time but now, in retrospect, I see that I had signs and symptoms."

Robinson recalls fainting spells and dizziness, feeling shaky and sweaty, and poor circulation in her hands and toes. She just didn't pay attention because of her youth, excellent physical condition and absence of risk factors like diabetes or high blood pressure.

She has formed her own nonprofit organization, Heartability (heartability.org), to advance her mission and support. She is passionate about advocating for and educating young women about living heart healthy.

Seeking a way to tell her story to a larger audience, Robinson sought the guidance of **Marla Mendelson, MD, '88 GME**. As director of the Bluhm Cardiovascular

Institute's Women's Cardiovascular Health Program, Mendelson devotes her time to the heart health of women of all ages. In fact, it is the program's focus on a wide age range that distinguishes it from all others.

The program started 10 years ago. Its mission? To provide clinical care to women with cardiovascular disease, educate both clinical peers and the community about recognizing and preventing heart problems and foster cutting-edge research. It grew out of Northwestern's Heart Disease and Pregnancy Program, which Mendelson, associate professor of Medicine in the Division of Cardiology and of Pediatrics in the Division of Genetics, Birth Defects and Metabolism, founded while completing her fellowship. She continues to run the program.

Eager to join forces, Mendelson invited Robinson to speak about her experience and organization at the program's symposium in May for medical professionals and the community. In addition, a support group for young women with cardiovascular problems is being discussed by the pair, as is including a link to Heartability on the program's website. Robinson also envisions visits to high schools and colleges to educate young women. With an undergraduate degree in biological sciences, and master's and PhD degrees in physical therapy, she understands the science of her cardiac experience and can well explain heart disease to other young women. She also has plenty of empathy and encouragement to give.

YOUTH NO PROTECTION

Awareness and prevention are the key words when discussing young women and heart health.

According to the American Heart Association, the number one myth about heart disease is that it doesn't affect young people. One in three Americans has cardiovascular disease. With the increasing prevalence of risk factors such as obesity and Type 2 diabetes, heart problems are becoming more common at a younger age.

Mendelson often sees the beginnings of later heart problems in many young

SPECIALIZING IN MATTERS OF THE HEART



Susan Kim, MD

Director, Cardiac Implantable Electronic Devices Clinic



Marla Mendelson, MD, '88 GME

Director, Women's Cardiovascular Health Program at the Bluhm Cardiovascular Institute

"I HAVE THE ABILITY TO TALK TO PEOPLE, ESPECIALLY YOUNGER PEOPLE, ABOUT WHAT THEY SHOULD LOOK FOR..."

pregnant women. She alerts them to pay attention to indicators such as high blood pressure during pregnancy when pressure typically should be low. Pregnancy is a good time to catch these indicators. Usually expectant moms are getting medical care and concerned about their health — a situation that often falls by the wayside for the next 20 years, allowing early symptoms to become full blown organ damage.

Being an advocate for your own health is also important in matters of the heart. Young women may need to insist that their doctors investigate symptoms that may be passed over because of age and lack of risk factors. Mendelson notes that sometimes doctors are too quick to dismiss symptoms in young women. “In the past when women have gone to the doctor for palpitations, doctors haven’t taken them seriously,” she says. “They blame it on diet pills...or anxiety. I think everyone deserves to have every possibility looked into.”

In fact, she recalls a patient with palpitations who had been diagnosed with mitral valve prolapse. “That’s a very common diagnosis in women, and she was told that it was no big deal,” says Mendelson. As it turned out, Mendelson discovered that the woman had been suffering an irregular health rhythm for years, which could have been diagnosed with a six-second electrocardiogram.

“I’m not an advocate for doing every test on every person, but we can’t ignore things either,” she says. “People tend to know their own bodies. You can only say everything is okay after you’ve done the heavy lifting.”

Mendelson points out that young women with heart problems do not have to be defined by them, and Robinson has taken that advice to heart. “You can’t be afraid of life,” she says. “I wasn’t before this experience, and I’m still not. Life has to move on. I could sit in a corner, but what fun would that be?” **M**



Getting married in Northwestern Memorial’s chapel was a fitting happy ending and new beginning for heart patient Shayna Robinson.

AT THE HEART OF THINGS

Northwestern Memorial not only helped to save Shayna Robinson’s life, but it also served as the backdrop for the love story that developed within its walls.

When Robinson awoke from her medically-induced coma, she saw her boyfriend of three months, Joshua, next to her bed. He met her family for the first time in her hospital room and the couple said, “I love you” for the first time there, too.

On the one-year anniversary of Robinson’s cardiac arrest, she and Joshua were married in Northwestern Memorial’s chapel among family and friends. The doorman from the building where Robinson suffered cardiac arrest, who was the first to call 911 on that fateful day, also is an ordained minister. He presided over Robinson’s wedding ceremony.

And a new little heart is now beating. The couple is expecting a baby.



Acceptance ----- for Life -----

Helping donor and recipient stem cells to "get along" by establishing a dual immune system could reduce or eliminate the need for lifelong anti-rejection drugs.

Innovative cell-based approaches induce immune tolerance in kidney transplant recipients

WRITTEN BY: Nora Dunne



→ Right now, there are more than 100,000 people in the United States on the waiting list for a lifesaving kidney transplant. Only a fraction of them will get one this year – in 2015, only 11,216 people received a kidney from a deceased donor, according to the Organ Procurement and Transplantation Network. Another 5,075 people received a kidney from a living donor. But even for those fortunate patients who got the kidney they needed, the journey to good health is far from over.

To prevent their immune system from rejecting the donated organ, all transplant recipients must take a mixture of toxic immunosuppressive drugs every day for the rest of their lives. These drugs come with serious side effects – including increased risk for infection, high blood pressure, diabetes, heart disease and even cancer – and sometimes they don't even work. (About 20 percent of kidney transplants will fail within three years.) But these drugs may not always be a necessity thanks to research spearheaded at Northwestern Medicine's Comprehensive Transplant Center.

"We're trying to reduce or eliminate entirely the need for drug-based immunosuppression, which is imperfect, costly and not without side effects," says Joseph Leventhal, MD, PhD, '97 GME, the center's surgical director of kidney and pancreas transplantation.

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Joseph Leventhal

MD, PhD, '97 GME

Surgical Director of
Kidney and Pancreas
Transplantation,
Northwestern Medicine
Comprehensive
Transplant Center

Fowler McCormick
Professor in Surgery

Transplant Surgeon,
Kovler Organ Transplan-
tation Center



STEM CELLS TRICK IMMUNE SYSTEM

Leventhal and colleagues have pioneered two innovative cell-based approaches to induce immune tolerance in transplant recipients. Their objective: to wean patients off immunosuppressive medication a year after surgery. The first approach involves transplanting a batch of the living donor's stem cells along with the organ. The cells trick the recipient's immune system into accepting the organ as its own, instead of fighting it off as it would other foreign invaders, like a virus or bacteria.

"The goal of this work is to induce a state called chimerism, where donor and recipient stem cells peacefully coexist within the recipient and establish a dual immune system that tolerates the kidney," explains Leventhal, who is also Fowler McCormick Professor in Surgery at Feinberg and a transplant surgeon in the Kovler Organ Transplantation Center at Northwestern Memorial Hospital.

Investigators have enrolled 40 patients in an ongoing phase II clinical trial at Northwestern that began in 2009 to test this stem cell protocol. So far, they've treated 31 patients and successfully withdrawn all immunosuppressive drugs in 20 of them. Remarkably, the study is the first to achieve this feat in mismatched, unrelated donor-recipient pairs.

Ideally, an organ donor and recipient should match on multiple levels to avoid rejection and achieve a long-lasting transplant. In addition to being blood type compatible, they should have the same human leukocyte antigens (HLAs), protein markers on cells that help regulate the immune response. Only identical twins are a perfect match, though siblings can match partially. Northwestern's stem cell-based strategy for inducing tolerance works for HLA mismatches, improving the odds that transplants from unrelated donor-recipient pairs will thrive in the long term.

The process begins about a month before transplantation. Bone marrow derived stem cells are collected from the donor's blood through a minimally-invasive process called pheresis. The cells are sent to the lab of collaborator Suzanne Ildstad, MD, director of the Institute for Cellular Therapeutics at the University of Louisville in Kentucky. Manipulated to facilitate safe transplantation, the cells are then cryopreserved. A week before scheduled surgery, the recipient undergoes conditioning — low doses of radiation and chemotherapy — to prepare the immune system to receive the donor stem cell infusion, which happens a day after the organ is transplanted.

"It's all very carefully choreographed and planned," says Leventhal, acknowledging a major caveat to this approach: currently, it only works for living donor transplants. "Two-thirds

of kidney transplants done every year are not from living donors. When a kidney suddenly becomes available from a deceased donor, we don't have a week's time to enrich the donor stem cells and condition the recipient."

Leventhal says that Northwestern, currently the only active clinical site for this research, will be the lead center for a phase III trial testing the stem cell protocol. He anticipates the trial to launch in 2017, with the support of a \$12 million grant from pharmaceutical company Novartis.

NO FIRE DRILL REQUIRED

The larger population of deceased donor organ recipients may benefit from a second strategy under investigation at Northwestern Medicine. Rather than relying on a transfusion of donor-derived stem cells, this approach involves expanding the recipient's own regulatory T-cells. These cells, called T-reg for short, suppress the immune system so it doesn't attack the body's own healthy tissue and have been shown to prevent transplant rejection.

The process involves collecting blood from a patient months or years before he or she receives a kidney transplant. From this sample, white blood cells including T-reg are separated out and sent to Northwestern Medicine's Mathews Center for Cellular Therapy, where a few million cells are multiplied into a few billion cells to be re-infused into the patient after transplantation. Leventhal named the strategy TRACT (T-reg for adoptive cell transfer).

"Instead of suppressing the immune system with drugs, we're trying to rebalance it with more regulation," he explains. "As we envision it, the moment a patient is told he or she will need a transplant, we can collect these T-reg and freeze them. Then when it's time to do the transplant,



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100,000

or more
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transplant

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living donor



"We want it to be one organ transplant for life. Every time this works, we'll have one less person coming back onto the waiting list for an organ."



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Fig. 1

Boosting a recipient's regulatory T-cells can prevent the immune system from attacking healthy kidney tissue.

we can thaw them out for expansion and infusion. There's not a fire drill aspect that exists with other cell-based approaches."

In 2014, Leventhal and principal investigator Anton Skaro, MD, PhD, '07 GME, received a \$500,000 grant from the Woman's Board of Northwestern Memorial Hospital to conduct the first ever clinical trial testing the safety of expanded T-regs in kidney transplant patients. This June, they will present the positive results from the nine patients who participated in the study. They hope to initiate a phase II trial with 120 patients later this year to explore both safety and efficacy but first must secure funding for such an ambitious study.

"It is extremely costly to manufacture the cells for cell-based therapies. A dose of T-regs costs \$40,000 to \$50,000," acknowledges Leventhal. He recently formed a company called TRACT Therapeutics to develop the technology for kidneys and other solid organ transplants, as well as to pursue applications for treating autoimmune diseases like inflammatory bowel disease and rheumatoid arthritis.

FEELING NORMAL

The benefits of withdrawing a patient from immunosuppression are twofold: It can potentially make a transplant last longer and it can improve a patient's quality of life. Currently, a successful kidney transplant lasts 15 to 20 years at best. Realistically, about half of all recipients will need a second or third transplant in their lives.

"We want it to be one organ transplant for life," says Leventhal. "We hope to make this possible by eliminating kidney transplant failure due to poor control of the immune system or the side effects of immunosuppressive drugs. Every time this works, we'll have one less person coming back onto the waiting list for an organ."

Last fall, Northwestern Medicine hosted an international workshop sponsored by the National Institutes of Health on immune tolerance in organ transplantation. The event highlighted the academic medical center's leadership in a burgeoning field of medicine.

"Immune tolerance following transplantation has been the holy grail for several decades, but only in the last few years have we made the types of discoveries that make it a reality," says Michael Abecassis, MD, MBA, director of the Comprehensive Transplant Center.

Abecassis is also chief of Organ Transplantation in Feinberg's Department of Surgery and division chief of the Kovler Organ Transplantation Center, where surgeons transplant more than 400 organs each year.

"Six years ago, we made a strategic decision that it was time to make immune tolerance happen clinically," he says. "We were extremely fortunate to be the first to achieve this elusive goal in mismatched kidney transplant recipients, and we believe that we have cracked the door open to broader applications of this approach."

As for the quality of life benefits that immune tolerance brings, Leventhal points to a poignant case involving two sisters with the same genetic kidney disease. Both needed a transplant. One sister participated in the stem cell trial and has now been off immunosuppression for years. The other, ineligible for the trial, continues to take the drugs.

"My patient says she feels normal. Although the initial process was arduous, she now doesn't feel like she's had a transplant," says Leventhal. "Her sister, meanwhile, has to worry about being in the sun, what's in the water when she goes to the beach or who she's sitting around during cold and flu season because her immune system is suppressed. These sisters live very different lives." **M**



From post-doc to division chief, new head of rheumatology makes big plans

WRITTEN BY: Cheryl SooHoo
PHOTOGRAPHY BY: Bruce Powell

Aiming High

Eighteen years ago, Harris Perlman, PhD, Mabel Greene Myers Professor of Medicine and the new chief of the Division of Rheumatology at Northwestern University Feinberg School of Medicine and at Northwestern Memorial Hospital, chose to pursue postdoctoral training at Northwestern in the lab of his now predecessor, former division head Richard Pope, MD. The then newly-minted PhD scientist with training in cell, molecular and developmental biology from Tufts University in Boston wanted to further his studies in apoptosis and the cell cycle. He felt Northwestern would best allow him to test the waters as an up-and-coming independent investigator.

"I wanted to see if I was good enough," says Perlman, a native of Skokie, Illinois, who was eager to return to the Midwest, with his wife, Melissa and their family, after his research training on the East Coast.

Impressed by his scientific pedigree — one of Perlman's graduate school mentors was Jeffrey Isner, MD, who pioneered the use of gene therapy to treat vascular disease — Pope soon discovered his new post-doctoral student "would be a force to be reckoned with." Not only did Perlman turn out to be an excellent scientist but he also showed traits from the very beginning that would make him the best choice for division chief.

"Harris is refreshingly energetic and incredibly inclusive," says Pope, who stepped down last September after 27 years from his leadership position but remains on faculty as Solovy-Arthritis Research Society Professor of Medicine. "He truly cares about this institution, our program and our people. Never self-centered, he always strives to make everyone around him better."

INFLAMED BY MACROPHAGES

Derived from the Greek words for "big eaters," macrophages — a type of white blood cell — have many jobs in the body's immune system, among them munching away at foreign invaders. The cells also produce TNF-alpha, a cytokine, or protein, implicated in the inflammatory processes that lead to destructive autoimmune conditions such as rheumatoid arthritis (RA), systemic lupus erythematosus and scleroderma. Perlman's lab focuses on the role played by macrophages as well as dendritic cells (another type of immune cell) in rheumatic diseases. He also studies the relationship between systemic inflammation and co-morbidities such as atherosclerosis and obesity.

The concept of macrophages as the principal player in the development and remission of inflammatory diseases has only come to the forefront in recent times. In the past two decades, new biologics that target TNF-alpha have revolutionized drug treatment for RA patients. Says Perlman, "There has been increasing recognition that these immune cells may be the most crucial cells involved in rheumatic disorders."

Career Milestones

1998

Began postdoctoral training at Northwestern

2008

Joined rheumatology faculty as an associate professor

2013

Demonstrated the role of macrophage plasticity in the pathogenesis of RA

2014

Launched the Rheumatoid Arthritis Synovial Tissue Network

Perlman spent eight years at Saint Louis University before joining Feinberg's rheumatology faculty in 2008 as an associate professor. Ever since, he has been a trailblazer in this area of inquiry. His research group was the first to show that macrophage plasticity drives the pathogenesis of RA. The investigators documented the monocyte (a white blood cell that eventually differentiates into a macrophage) populations needed for the development of inflammatory arthritis in mice. They demonstrated that the animals still get the arthritis despite the depletion of inflammatory monocytes — thought to be the first responders to inflammation. The researchers concluded that the resident monocyte population appears to be the central monocytic cell initiating the disorder. According to Perlman, this finding represents a major shift in the understanding of monocyte recruitment and the differentiation of macrophages in the joint.

In other words, zeroing in on the cause of disease could vastly improve the chances of effectively treating it.

PRECISION MEDICINE WITHIN REASON

Less than 50 percent of RA patients experience effective long-lasting relief from existing drugs — even the latest biologics. Of greater concern, one quarter of these individuals don't respond to any therapy at all. Macrophages have potential as the bull's eye for better personalizing current therapies by providing genetic signatures for individual patients with RA and other conditions. This information could serve as an invaluable resource for treatment planning.

"By isolating macrophages in patients with rheumatic disease, we can begin to identify potential biomarkers to more precisely determine which therapies will work for any given individual," says Perlman.

Obtaining those cells for analysis using advanced flow cytometry and next generation sequencing, though, will require a different approach from rheumatology experts more akin to what's been happening in the cancer care arena. "It used to be thought that a blood sample was enough to obtain a transcriptional profile, but unfortunately it isn't," continues Perlman, who is also director of Flow Cytometry and a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. "While certainly more invasive, taking biopsies of diseased tissue yields the best results for predicting therapeutic choice and response."

For RA patients, the affected tissue resides in the joint, or synovium. Ultrasound-guided synovial biopsies for the purposes of precision medicine are commonplace in Europe, where rheumatologists routinely perform the procedure, but not in the United States. In September 2014, Northwestern Medicine became the lead institution of a six-member consortium of distinguished academic rheumatology

groups spearheading the National Institutes of Health-funded Rheumatoid Arthritis Synovial Tissue Network (REASON). Perlman serves as principal investigator. The network's purpose? To train a new generation of American rheumatologists in the procedure and to create biorepositories for the synovial tissue samples.

However, REASON is only one component of a much larger plan. Perlman ultimately intends to create a Northwestern Medicine Center for Precision Medicine in Rheumatology, where whole populations and single cells will be analyzed for their epigenetic, genetic and proteomic profiles to enhance treatment. Within the health system, opportunities abound for the collection of tissue isolates from throughout the body where systemic inflammation inflicts damage. For example, much can be potentially gleaned from studying kidney biopsies from patients with renal failure due to lupus.

Currently, a substantial biorepository houses skin and esophageal biopsies from patients enrolled in the division's Scleroderma Program. Monique Hinchcliff, MD,

"Like a great chess player, he's already 10 moves ahead."

'07 GME, associate clinical director of the program and assistant professor of Medicine in the Division of Rheumatology, spearheaded efforts to determine how gene expression in these tissues can be used as scleroderma biomarkers. The disorder typically causes hardening of the skin due to collagen buildup as well as



Perlman started his career as a research assistant at Columbia University. He now mentors budding investigators, including member of the Perlman lab Vince Morgan, who will soon be going to medical school.

lung fibrosis, a major cause of death for these individuals. To collect samples of lung tissue from scleroderma patients, Perlman and Scott Budinger, MD, chief of Pulmonary and Critical Care in the Department of Medicine, whose clinical and research interests include lung injury caused by scleroderma, are working in tandem with thoracic surgeon Ankit Bharat, MBBS, and pulmonologist Sanjeeta Borade, MD, in Northwestern Medicine's lung transplant program. Budinger shares the same vision that Perlman intends to realize as chief to establish the division as one of the leaders in the "omics" arena – genomics, proteomics and other emerging areas.

"New tools and technology are allowing us to isolate macrophages from tissue samples and look at the transcriptome of these cells and others to better understand human disease to guide patient care," says Budinger. "It makes sense from a biological context to begin looking at all clinical specimens in this way. We hope to apply this vision across the entire Northwestern Medicine clinical operation.

A NEW GENERATION


Perlman joins a short list of rheumatology chiefs at Northwestern Medicine. Establishing the division some 50 years ago when the specialty was in its infancy, Frank Schmid, MD, the late founding chief, led it for 25 years. Pope followed closely on his heels, serving for more than a quarter of a century.

This longtime stability in the division provides Perlman, 45, with the perfect springboard to elevate its status. Solidly the top program in the state, Northwestern Medicine's rheumatology division ranks 13th in the nation, according to *U.S. News & World Report*. Perlman would like to increase that ranking. He has been busy recruiting additional faculty members in his expansion efforts, especially from a homegrown pool of talent. Former fellow Amy Archer, MD, PhD, '15 GME, is setting up the division's new vasculitis clinic. Mary Mahieu, MD, will complete her fellowship this summer and run the lupus and scleroderma clinical trial programs.

"These are the new faces of rheumatology," enthuses Perlman. "We are

fortunate to have many senior faculty members to provide us with the continuity we need to push forward our division and build the next generation of leaders in our specialty."

The only PhD heading a rheumatology division in the country, Perlman has always worked closely with clinicians throughout his career. In fact, many of the fellows coming through the division have conducted research in his lab. Eric Ruderman, MD, professor of Medicine in the Division of Rheumatology, serves as clinical practice director, overseeing the clinical operations of the division – allowing his new chief to do what he does best.

"Harris has always had the big picture in mind and never loses sight of how scientific discoveries will impact human disease and people down the road," says Ruderman. "His leadership style is driven by his vision. It's not about what we are going to do tomorrow to be incrementally better but what do we need to do today, so that in five years we are the best rheumatology division in the country. Like a great chess player, he's already 10 moves ahead." 

Alumni President's Message



Dear Fellow Alumni:

By the time this issue of *Northwestern Medicine Magazine* reaches you, Match Day 2016 will have come and gone. For a medical student, few events are as life-altering as this one. Not only does the Match determine where graduates will spend the next several years and perhaps much of their professional careers but it also triggers the beginning of the several-week mental catapult from student to resident. Finally, and relevant to this column, it marks the transition from Feinberg School of Medicine student to alum.

As an alumnus who has preceded you in this journey, I would offer the following advice to prepare for Match Day and beyond:

- » **Don't fret.** You will find that you are very well-equipped.
- » **You are now part of the much larger Medical Alumni Association (MAA) community.** While the Feinberg School is spread over a few blocks along Lake Michigan, the MAA "campus" spans the entire United States, more than three million square miles, and, considering

our international graduates and the Center for Global Health, much of the planet.

- » **The need for mentoring does not end with graduation,** and the MAA stands ready to help. Having navigated several career transitions myself, I can attest to the importance of the invaluable advice of those who preceded me, including fellow Northwestern medical alums.

The Medical Alumni Association Board (MAAB) has placed a priority on mentoring and engaging all alumni. Under the leadership of **Rishi Reddy, '00 MD** (chair of the Mentoring Committee), the MAAB organized mentoring and networking events during Feinberg's Alumni Weekend in April that provided valuable opportunities for students to connect with alumni and potential mentors. We also signed up alumni and students for the new Northwestern Network Mentorship Program, an online platform to allow students and alumni to connect in an ongoing manner.

The MAAB has also placed a priority on scholarship fundraising and continued progress toward a medical school that can provide tuition support to all students. Benefactors of all types have helped Feinberg solidify its position as a top tier institution, nationally and internationally. However, few understand the importance of scholarship support and the negative impact graduating with crushing debt has on fledgling professionals better than the members of the MAAB.

Under the leadership of **Jim Kelly, '73 MD, '07 MBA** (MAAB president-elect and chair of the Engagement Committee) and with the help of Larry Kuhn and Babette Nyka, and their staff, the medical school has partnered with the Northwestern Memorial Foundation and Northwestern Alumni Association in organizing regional events throughout the "MAA campus" in recent months, including the following:

- » **Evanston, Illinois:** Sponsored tailgate events at the football games against Stanford University and Penn State University, and a pre-game event for the Northwestern basketball game against the University of Illinois
- » **Naples, Florida:** Partnered with Northwestern Memorial Foundation to host a cocktail reception, featuring presentations from the Robert H. Lurie Comprehensive Cancer Center of Northwestern University
- » **Palm Beach, Florida:** Participated in joint event with the Northwestern Alumni Association
- » **Phoenix:** Hosted a reception at the Musical Instrument Museum on "Fine Tuning Precision Medicine"
- » **Seattle:** Held a brunch for alumni and friends
- » **Elsewhere:** Hosted regional Happy Hours in Texas, Oregon, Missouri and North Carolina
- » **And coming soon:** The MAAB is planning events in Wisconsin, California and South Carolina.

We would love to hear from you. Please let us know if you are interested in helping us organize an event near you. For more information on regional events, annual Alumni Weekends or the MAA in general, please contact Babette Nyka, director of alumni engagement at babette.nyka@northwestern.edu or Dan Schwarzlose, assistant director of alumni engagement, at daniel.schwarzlose@northwestern.edu.

And to the Class of 2016, congratulations! Please let us know how your Medical Alumni Association can help.

Sincerely,

Bruce Scharschmidt, '70 MD (HPME)
Medical Alumni Association Board President

Reconnecting at Alumni Weekend

WRITTEN BY: Nora Dunne

PHOTOGRAPHY BY: Nathan Mandell

See the Alumni Weekend 2016
slideshow online at magazine.nm.org



A SATURDAY MORNING WALK ON THE CHICAGO CAMPUS ENERGIZES ALUMNI AND GUESTS FOR THE DAY'S EVENTS.

Joan Short, '56 MD, traveled to Chicago this spring to celebrate the 60-year anniversary of her medical school graduation, when she was one of just seven women in a class of about 130 students.

"There were very few opportunities for women in those days," she recalls. "Getting an education here afforded me the opportunity to live abroad and to do all the exciting things I've done in my life."

Short went on to practice pediatric neurology all over the world, including 10 years in Saudi Arabia and time in Haiti, Vietnam, Australia and Romania. "But Chicago is still one of my favorite cities," she says, admitting that she doesn't recognize much of Feinberg's campus these days. "They've torn down hospitals, built new ones. Everything is new." Short joined more than 400 alumni and guests who participated in Alumni Weekend April 29 and 30 to reunite with

old classmates, share memories and catch up on the latest happenings at the medical school.

Over two days, Alumni Weekend attendees took part in dozens of events, including continuing medical education, walking tours of the campus, a mentoring lunch with current medical students, forums led by Feinberg faculty, class dinners and more.

On Friday morning, Michael B. Scott, '71 MD, a urologist in Pasadena, Florida, caught up with classmate Bill Barnhart, '71 MD, a retired geriatric medicine specialist from Rockford, Illinois. While looking at old class photos, they reminisced about playing ping-pong in the dorms of Abbott Hall and doing anatomy labs in the Searle building. "Everything I learned here, I've carried on in my career," says Scott. "My professors were instrumental in my

development, especially my mentor, V.J. O'Connor, who shepherded me into urology."

Later that day, Eric G. Neilson, MD, vice president for Medical Affairs and Lewis Landsberg Dean, delivered an update on the medical school. He shared his vision for the future of Northwestern Medicine. Neilson discussed Feinberg's increasing national rankings and medical student profile, its expanding campus and research enterprise, and the school's initiative to strengthen diversity and inclusion programs.

"I view diversity as a way of tracking metrics about who we are, and I view inclusion as our culture — how we are making sure everyone feels like they have a place and a role in what we're

// Getting an education here afforded me the opportunity to live abroad and to do all the exciting things I've done in my life. //

doing, not only as a medical center but in our approach to health care and our approach to science," he says.

Barbara Gosink, '66 MD, who attended the dean's update, traveled from San Diego for her 50-year reunion. "It's very nostalgic to be here, to see old friends and to see how the school has changed," she says, sitting beside her husband, fellow alumnus Leonard Gosink, '65 MD, '71 GME. "It's nice to look at the lake, to laugh about how small tuition was back then," he says. "It cost \$1,100 when I started here."

In the evening, attendees gathered for a celebration that included dinner, dancing and a photo booth. They saluted 26 members of the Class of 1966 who were commemorating the 50-year anniversary of their graduation, and then Michael Parmacek, '81 MD, '87 GME, was presented with the Distinguished Alumni Award.

"It's great to be home," says Parmacek, who is now the Frank Wister Thomas Professor of Medicine and chair of medicine at the University of Pennsylvania Perelman School of Medicine.

He described Northwestern as not only the school where he received a medical education but also as the place where he began a research career as a cardiology fellow and learned the importance of high-quality clinical care.

"My training at Northwestern set the foundation and core values that formed the pathway for my career." **M**





TRAVELING FROM NEAR AND FAR, MEMBERS OF THE CLASS OF 1966 (LEFT) REUNITE AT THEIR ALMA MATER TO CELEBRATE THEIR 50-YEAR ANNIVERSARY.



THE FEINBERG SCHOOL OF MEDICINE WELCOMED ALUMNI TO ALUMNI WEEKEND WITH A RANGE OF ACTIVITIES – FROM TOURS AND LECTURES TO LUNCHESES AND FUN RUNS.



Progress Notes

'50s

Robert Boxer, '56 MD, of Wilmette, Ill., remembered former first lady Nancy Reagan's ties to the medical school in a letter to the editor published in the *Chicago Tribune* shortly after her March 6 death. During his first year at Northwestern, he recalled that the recently married Mrs. Reagan assisted her mother, who was married to Loyal Davis, MD, then chair of surgery, in the direction of the precursor to today's student-performed *In Vivo* show: "*Quo Vadis Medicus*." He writes, "... she, an actress, was going by her stage and maiden name: Nancy Davis. She was involved in our production. She was kind, helpful and greatly appreciated. The rest is history."

A themed musical comedy created by medical students for alumni, "*Quo Vadis Medicus*?" (translation: "Where are you going, physician?") ran from 1952 to 1959.

Howard Sanford, '58 MD, recently retired from a 20-year position as a student health physician at Florida International University, after spending 30 years in private practice as an internal medicine specialist in Miami.

'70s

Richard Raskin, '72 MD, is a board-certified internist/rheumatologist and serves as vice president of medical affairs for Genesis HealthCare in Andover, Mass. He oversees the clinical care provided at 120 skilled nursing and rehabilitation centers across New England. He also provides direct patient care as medical director of the company's facility in Camden, Maine.

In his spare time, he has completed 29 marathons, plays jazz piano with Blue Skies Big Band (<http://blueskiesbigband.usa/>) and is a fanatical Wildcats football fan (Go Cats!). He and his wife, Ellen Belanger, have five children and six grandchildren.

James McKechnie, '74 MD, retired after 35 years in a private orthopaedic surgery practice in East Central Illinois. He writes, "I am enjoying retirement with my wife, Karen, of 45 years. We are shepherding grandchildren, reading, gardening and treating ourselves to international travel, which there was never time previously to do."

James Lee, '79 MD, writes, "I have been a full-time practitioner in family medicine for 33 years and will continue for many more. I

have been involved in medical volunteer work during that time and currently work monthly evenings at the St. Stephen's Homeless Shelter Clinic in Minneapolis. My wife and I started a charitable vineyard (lostcreekhippiesvineyard.com) in 2007, giving 100 percent of profits to three outstanding charities!" The charities are People Serving People, Habitat for Humanity and Central Asia Institute.

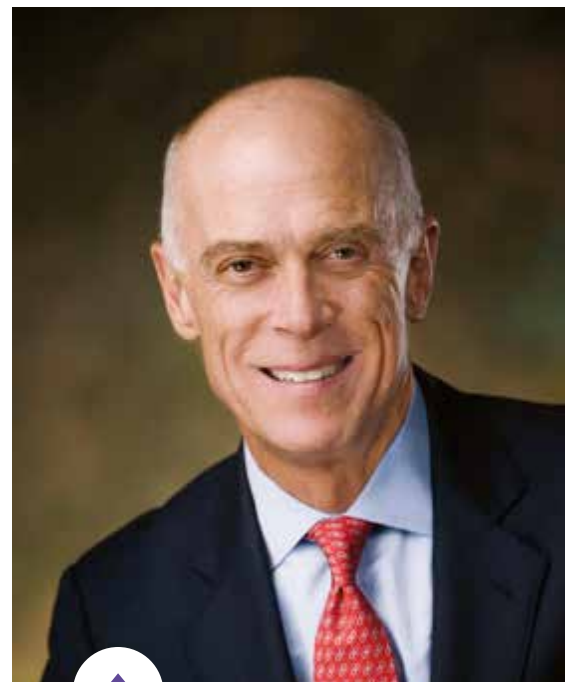
Andrew Senyei, '79 MD, managing director of Enterprise Partners Venture Capital, in La Jolla, Calif., was appointed to the board of directors at ProtoStar Inc., a newly-formed company that designs and manufactures a new category of medical walkers that enable users to stand upright and walk safer, longer and more comfortably.

'80s

Boris Lushniak, '83 MD, attended a September ceremony welcoming new officers of the U.S. Public Health Service Commissioned Corps (PHSCC). Lushniak, a PHSCC rear admiral, served as the acting



U.S. PUBLIC HEALTH SERVICE COMMISSIONED CORPS
REAR ADM. BORIS LUSHNIAK, '83 MD, (LEFT) WELCOMES A NEW OFFICER.



surgeon general of the United States from July 2013 to December 2014. He retired as rear admiral and Deputy U.S. Surgeon General from the U.S. Public Health Service in October. In November, he was selected as professor and chair of the Department of Preventive Medicine, Uniformed Services, University of Health Sciences, Bethesda, Md.

Margaret Overton, '83 MD, '87 GME, is a practicing anesthesiologist at Advocate Lutheran General Hospital in Park Ridge, Ill. Outpost 19 Books published her second book, *Hope For a Cool Pillow*, on March 1, 2016 (<http://www.margaretoverton.com/HopeForACoolPillow.html>). It is a memoir that deals with end-of-life care.

The book is described as: "A passionate argument for planning end-of-life care written by a physician, daughter and student of American health care. Margaret Overton taps her experiences as a doctor and with her own aging parents, as well her studies at Harvard, to make a universal case that will help others make informed choices about end-of-life care." Overton is also the author of *Good in a Crisis*.

Ahmed Abdullah, '85 MD, is a plastic surgeon. Born in Lahore, Pakistan and raised in Karachi, Abdullah came to the United States for college and stayed for medical school at Northwestern and his residency in Texas, where he met his wife, Kay. In 1995, he established the Plastic Surgery Institute in a rented office in Fargo, N.D. It has now grown to include five buildings. He and his wife have twin sons, now in their 20s.



Ellis M. Arjmand, '86 MD, '96 PhD, is a professor of otolaryngology and pediatrics at Baylor College of Medicine in Houston, where he holds the Bobby Alford Endowed Chair in Pediatric Otolaryngology and serves as chief of the otolaryngology service at Texas Children's Hospital. He is also an adjunct professor of management in the Jones Graduate School of Business at Rice University, where he lectures on healthcare management and quality improvement.



Sheila Gujrathi, '96 MD, the former chief medical officer at Receptos in San Diego, was appointed to the board of directors at Five Prime Therapeutics, headquartered in South San Francisco.

Ramesh Subramani, '96 MD, MBA, MPH, announced the release of *Health On Demand* (Morgan James Publishing), on April 5, 2016. The book analyzes more than 250 digital health innovations and translates them into actionable health plans to make

health care faster, better, smarter and cheaper for any consumer.

Subramani is the chief medical officer for Analyte Health, one of the country's largest telemedicine companies, which aims to break down barriers to care while improving quality and outcomes. He formerly worked in venture capital at New Leaf Ventures, did management consulting for McKinsey & Company and was an assistant professor in the Department of Emergency Medicine at the Feinberg School of Medicine. His career blends medicine, technology, business and public health — all the while focusing on improving health systems and empowering patients.

Visit his blog at healthdisrupted.com and his book site at healthondemandbook.com.

Subramani is also passionate about helping disadvantaged young people. He started one of the largest tutoring programs for at-risk youth in Chicago and helped establish a College of Engineering for women in rural India.

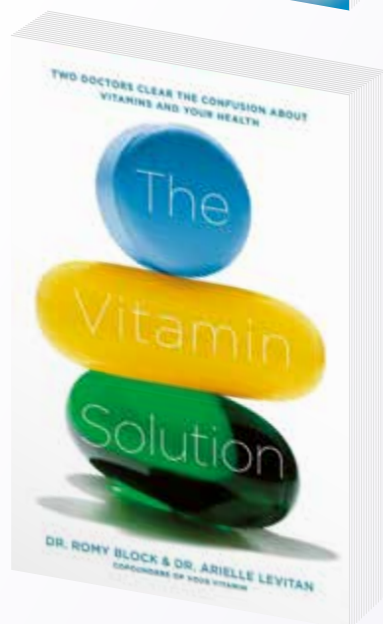
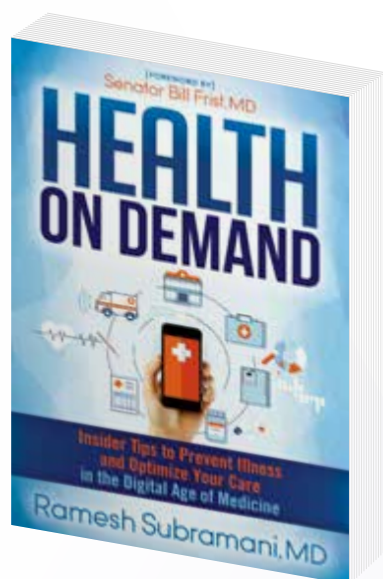
He and his wife, Sanjivini, travel together frequently. Their more recent travels include diving the Great Barrier Reef and visiting various temples in Japan. They also enjoy meditating, yoga and helping with various charities.

Earl Schott, '97 MD, serves as president of Rocky Mountain Radiologists, a 25-physician single-specialty group based in Denver.

Arielle Miller Levitan, '98 MD, '01 GME, has co-authored a new book, *The Vitamin Solution: Two Doctors Clear the Confusion about Vitamins and Your Health* (She Writes Press), which was released on November 17, 2015.

In *The Vitamin Solution*, Levitan and her colleague, Romy Block, MD, cut through conflicting data about vitamins and minerals to provide a concise, medically sound approach to supplement use. They explain which supplements can be helpful, which can be harmful and which are altogether unnecessary; they explore health conditions and symptoms, including diabetes, hair loss, fatigue, hot flashes and more; and address preventive care, providing insights on topics such as screening tests and preserving memory.

Three Northwestern alumni who are proud members of Integrated Healthcare Associates (IHA), a multi-specialty physician group with headquarters in Ann Arbor, Mich., enjoyed catching up at the 2015 IHA Annual Banquet. **Kevin Bohnsack, '98 MD**, (left) is associate division head of Clinical Quality for IHA's Division of Family Medicine; **Carol King, '96 MD**, is site medical director for IHA



Canton Family Medicine and chair of the IHA Patient Experience Committee; and Michael Otto, MD, '83, '84 GME, is an IHA infectious disease physician and medical director of St. Joseph Mercy Home Care.

'00s

Lizbet Ronning (Langseth), '01 MD, and Kristian Ronning announced the birth of their son, Espen Magnus Martin Ronning, on December 15.

Anita Kumar, '08 MD, of New York City, was appointed to the staff of Memorial Sloan Kettering Cancer Center in July 2014 as an assistant attending physician. Kumar completed her hematology/oncology fellowship at Sloan Kettering and her residency in internal medicine at the Brigham and Women's Hospital at Harvard Medical School.

Didi Omiyi, '08 MD, an orthopaedic surgeon at St. Anthony's Memorial Hospital in Effingham, Ill., was appointed to the hospital's board of directors.

Matthew "Matt" Eakins, '09 MD, recently joined Unified Physician Management's executive team as vice president of operations after several years as a consultant with McKinsey & Company. He now manages a nationwide network of OB/GYN groups with nearly 1,000 private practice physicians. He, wife Megan, son Theodore and daughter Amelia live in Boca Raton, Fla.

GME

Orthopaedic surgeon Anthony S. Rinella, MD, '01 GME, of Homer Glen, Ill., founded the nonprofit Global Spine Outreach (GSO), a group committed to helping treat underprivileged children around the world who suffer from complex spinal problems. GSO surgeons, allied health specialists and volunteers perform vital surgeries, train local surgeons in advanced techniques and



DAVE DRELICHARZ, '07 MD, AND JENNIFER LAVIN, WELCOMED JACKSON DAVID DRELICHARZ INTO THE WORLD ON NOVEMBER 7. HE WEIGHED 6 POUNDS 15 OZ.

safety protocols, and continue the study of complex spinal problems during annual trips to Cali, Colombia; Chihuahua, Mexico and Poznan, Poland.

Two alumni recently joined DuPage Medical Group, one of the largest multi-specialty physician groups in Illinois. Niraj Ajmere, MD, '05 GME, a board-certified gastroenterologist, became a member of the gastroenterology department and Nasir Siddiqui, MD, '12 GME, a board-certified diagnostic radiologist, the radiology department.

Brian Weatherford, MD, '13 GME, of Chicago, an orthopaedic surgeon, joined Illinois Bone & Joint Institute in September.

Brian Clay, MD, '14 GME, of Schaumburg, Ill., a physiatrist and interventional pain management specialist, joined the physician team at the Illinois Bone & Joint Institute in August.

DDS

Stephen Marsh, '65 DDS, of Colorado Springs, and his wife, Pamela, joined fellow Northwestern Dental School alumni from the Colorado area in Denver for a 50th reunion luncheon in October. The attendees included Donald Hogue, '65 DDS and his wife, Dorothea; Roger Boltz, '65 DDS; Sheldon Carr, '65 DDS and his wife, Mary Washington Carr; Morton Sperling, '66 DDS; and Richard Wiedey, '65 DDS and his wife, Jan. **M**

Progress Notes

Awards and Honors

'50s

Kenrad E Nelson, '58 MD, co-chaired an international meeting of the Scientific Technical Advisory Group (TAG) in Tbilisi, Georgia, in early November. The purpose of the gathering was to advise a coalition from the Georgian government, the U.S. Centers for Disease Control and Prevention, and Gilead Sciences, an American biopharmaceutical company, on a program

to eliminate Hepatitis C virus (HCV) infections. In Georgia, the rate of HCV infection in adults is 7.1 percent.

A nationwide campaign, the program strives to prevent new HCV infections and better detect and treat already infected individuals. Several recently available, highly effective antiviral drugs, Sovaldi and Harvoni, are being used to cure HCV.

institution and cancer treatment center. Prior to joining City of Hope in 2014, Dr. Rosen served for 24 years as director of Northwestern's Robert H. Lurie Comprehensive Cancer Center and was the Genevieve Teuton Professor of Medicine at the Feinberg School of Medicine.

'80s

In January, Eileen Costello, '86 MD, was named the chief of ambulatory pediatrics at Boston Medical Center (BMC). Dr. Costello came to BMC from Brigham and Women's Hospital/Southern Jamaica Plain Health Center, where she specialized in the primary care of children with neuro-developmental disorders, including autism, as well as children with mental illness. She also is an instructor at Harvard Medical School.

Costello has been honored throughout her career with numerous awards, including the Thayer Academy Humanitarian Award for Community Service, the Portraits of Inspiration Award by the Asperger's Association of New England, a Boston Children's Hospital Excellence in Community Pediatrics Award and as a two-time recipient of the Partners HealthCare Partners in Excellence Award.

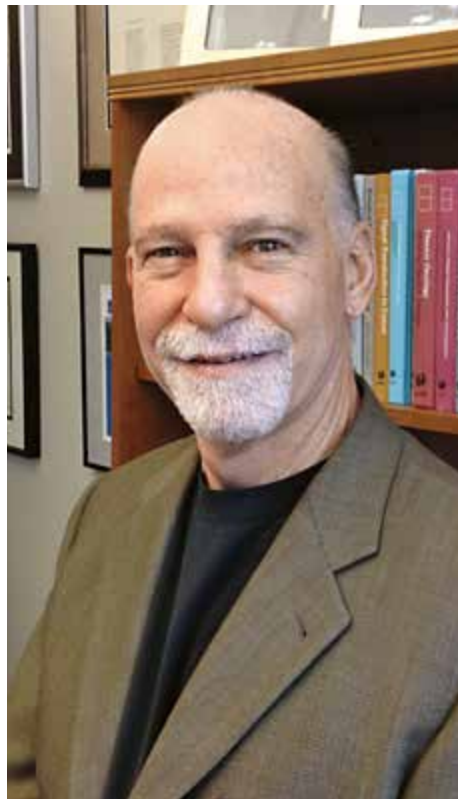
'60s

Eugene Bauer, '67 MD, co-founder and chief medical officer of Dermira, Inc., received a Presidential Citation award from the American Academy of Dermatology.

'70s

Steven T. Rosen, '76 MD, '79, '81 GME, of Duarte, Calif., provost and chief scientific officer for City of Hope, received a Lifetime Achievement Award from the Israel Cancer Research Fund in November. The award recognizes his long-standing commitment to advancing science and medicine, while providing extraordinary patient care. He sets the scientific direction for City of Hope, an independent biomedical research





ACCOLADES CONTINUE FOR MEDICAL SCHOOL ALUMNI. EILEEN COSTELLO, '86 MD, HAS TAKEN A LEADERSHIP POSITION AT BOSTON MEDICAL CENTER, AND STEVEN T. ROSEN, '76 MD, '79, '81 GME, RECEIVED A PRESTIGIOUS HONOR FROM THE ISRAEL CANCER RESEARCH FUND.

Also an author, Costello wrote the well-known book, *Quirky Kids: Understanding and Helping Your Child Who Doesn't Fit In*, highlighting her creative and innovative approaches to both clinical care and specifically to children with neuro-developmental challenges.

Alexander J. Ghanayem, '89 MD, has been named chair of the Department of Orthopaedic Surgery and Rehabilitation for Loyola University Chicago Stritch School of Medicine and Loyola University Health System. Ghanayem will lead the department's academic initiatives as well as Loyola's clinical and graduate medical education programs.

Ghanayem joined Loyola in 1995 as an assistant professor. In addition to orthopaedic surgery, he is a professor in the Department of Neurological Surgery. His clinical expertise includes spine surgery for a variety of conditions, including the cervical and lumbar spine.

For the past 20 years, Ghanayem has helped establish the orthopaedic surgery department as an internationally renowned center for education, research and patient care.

'90s

Andrew M. Eisen, '94 MD, was appointed chief academic officer for the Valley Health System, the Southern Nevada division of Universal Health Services, in January. He oversees the development of new residencies and fellowships across a system of five (soon to be six) acute care facilities. Eisen, a pediatrician, was most recently with the Touro University Nevada College of Osteopathic Medicine as associate dean for clinical education and director of the school's Center for Autism and Developmental Disabilities.

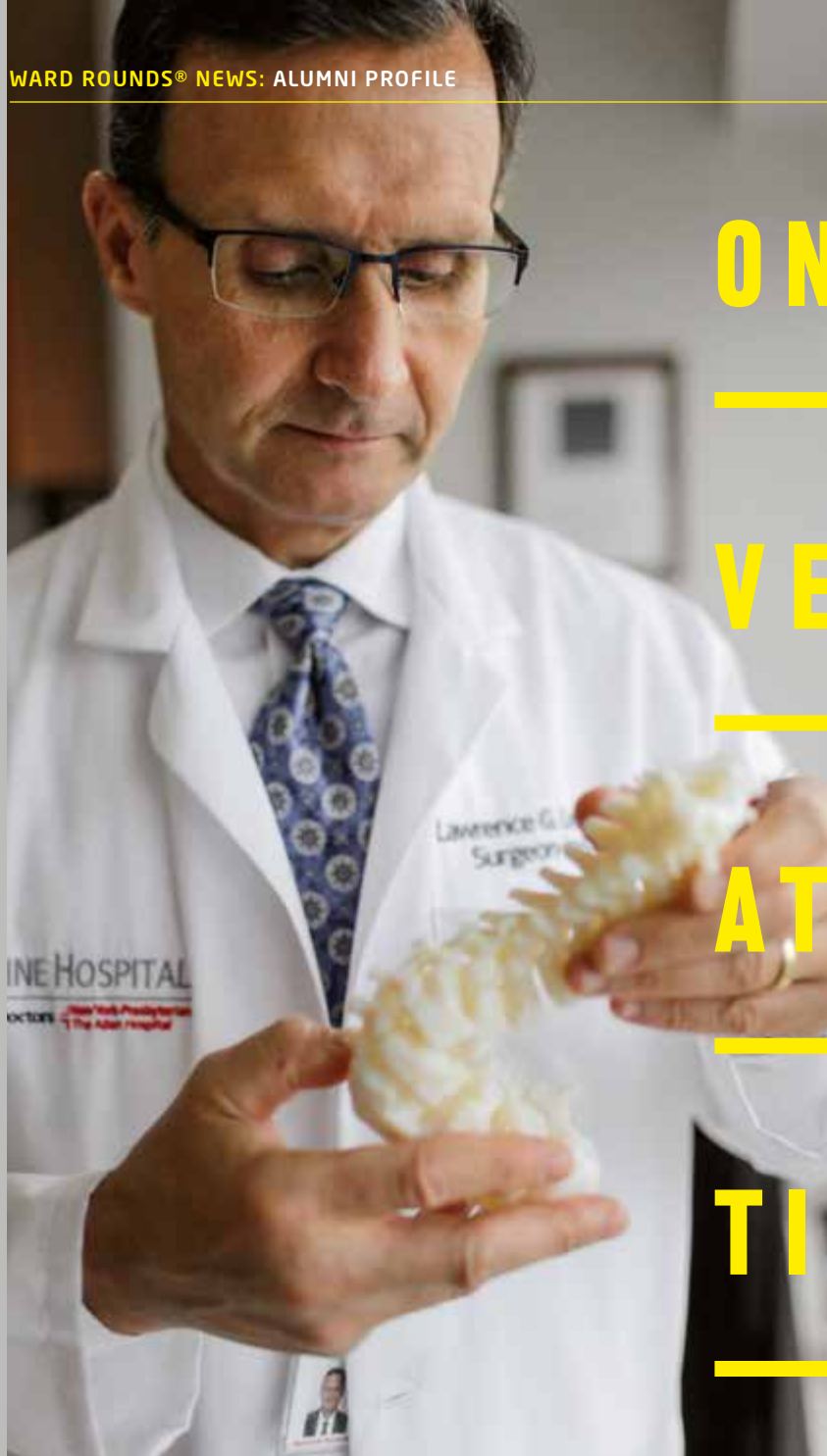
Bolstering the healthcare workforce in his state, Eisen has been a proponent of

adding and expanding residency programs in southern Nevada. Nevada ranks near the bottom among states for the number of doctors per capita, making it difficult for patients to schedule appointments with new providers, according to Eisen.

'10s

Peter S. Pang, '13 MS, MD, was selected for the 2015 Best of Chicago Award in the Physicians category by the Chicago Award Program. Each year, the program identifies local companies that have achieved exceptional marketing success in their community and business category. These companies enhance the positive image of small businesses through service to their customers and the Chicago community. **M**

ONE — VERTEBRA — AT A — TIME —



Lawrence Lenke, '86 MD, counts his clinical rotations and mentors in spinal surgery and sports medicine who took him under their wing among his favorite memories of medical school.

Now, a leader in spinal deformity surgery and chief of spinal surgery as well as surgeon-in-chief of The Spine Hospital at New York-Presbyterian/Allen Hospital at Columbia University College of Physicians and Surgeons, Lenke credits his alma mater for his stellar career in academic medicine. It was one he sought because of the group mentality of working as a team, the energizing environment of being around all levels of medical trainees and having the opportunity to practice medicine and surgery and teach at the same time.

"My years at Northwestern set me up to realize the best care was being done at academic medical centers because they teach the next generation of physicians and surgeons," he says. "Northwestern led me on a pathway of surgery and a lifelong commitment to research and education."

WRITTEN BY:
SARAH PLUMRIDGE

Lenke initially considered specializing in cardiothoracic surgery, but after witnessing the diversity of orthopaedic surgery specializations during his medical school clerkships, he gravitated toward the challenges of spinal surgery.

"Spinal surgery is complex, detailed and delicate," he says. "You really have to do technically excellent surgery and take very good care of your patients."

After receiving his medical degree from Northwestern, Lenke completed his internship and residency training in orthopaedic surgery at Barnes-Jewish Hospital/Washington University School of Medicine in St. Louis. While there, he also completed a fellowship in pediatric and adult orthopaedic spinal surgery and stayed on staff, rising from the ranks of assistant professor to being named the Jerome J. Gilden Distinguished Professor in less than 10 years.

As a spinal deformity specialist, Lenke treats people with conditions including scoliosis, a sideways curvature of the spine as seen from the front; kyphosis, an exaggerated curvature of the spine as viewed from the side; and spondylolisthesis, displacement of one vertebra on the next, among others. His current practice includes treating some of the most complex spinal deformity patients from around the country and world who come to New York for their care.

"The most exciting thing about my work is making a huge difference in a person's life. It's a gratifying and quite humbling experience to give someone with a crippling spinal deformity a more

normal appearance and improve their heart and lung function, in addition to giving them both a longer life expectancy and a better outlook on life."

THE BIG APPLE

After 29 years at Washington University-St. Louis creating spine programs and leading research advances in spine surgery, Lenke and two of his colleagues, Dan Riew, MD and Ron Lehman, MD, decided to share their expertise on a bigger stage. Last year they established the first spine hospital in Manhattan in New York City.

Lenke and his team have created a unique program that solely focuses on adult and children having and recovering from spinal surgery. While most surgeons performing spinal surgery have been trained in orthopaedics or neurosurgery, Lenke hopes the hospital will lead the way in training specialists in spinal surgery as a distinct discipline on its own. It will combine the best from the disciplines of both orthopaedic and neurological spinal surgery.

At the hospital, everything from the operating rooms to the allied health profession workers (nurses, physical and occupational therapists, social workers, nutritionists) are specialized for spinal surgery. The team also takes a multipronged approach to spine care, including surgical and non-surgical options for treating patients.

"This new chapter in New York is very exciting," says Lenke. "The early patient outcomes have been extremely high due to the focus of our facility and personnel on spinal surgery patients exclusively."

Lenke has published nearly 400 peer-reviewed research manuscripts and continues to conduct research in spinal deformity surgery and patient safety. Working to make spinal surgeries safer, he has investigated methods to improve pulmonary function and breathing capacity following surgery and doing a better job

**"THE MOST
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of monitoring the upper and lower extremity neurological function during these very long operations, many taking more than eight to 10 hours.

He also has found that using multidisciplinary teams and thorough preparation leads to better patient outcomes — all information he wants to share. "By doing research and optimizing your own surgeries, you make yourself a better surgeon," he says, "but by publishing research papers and presenting


information at our educational meetings, you are helping other surgeons do a better and safer job for their patients. This exponentially increases the impact that I can have on optimizing patient care."

PROUDEST ACCOMPLISHMENTS

One of Lenke's proudest moments came when he was elected president of the Scoliosis Research Society, the oldest spine society in the world with the mission to advance the care of patients with spinal deformity globally. The youngest president to be elected, Lenke served from 2010 to 2011. He also chaired a task force that led to the development of a new journal, *Spine Deformity*, which launched in January 2013. Says Lenke, "To be elected by my peers for this prestigious leadership role is the highlight of my career thus far."

Lenke also was honored with the North American Spine Society's Leon Wiltse Award in 2013 for excellence in leadership and/or clinical research in spine care. "It was very gratifying and meaningful to receive this award," he says. "Dr. Wiltse was one of the great legends in spine care and research."

Yet for all of his accomplishments, Lenke continues to learn the most from his patients.

"No matter how tough a time I'm having, it's hard to feel sorry for yourself when you have patients in the ICU," he says. "I've been pretty lucky. I've had a good life and a great family." 

In Memoriam

Nadine Nicole Allen, MD, '10 GME, of St. Louis, died Feb. 1, 2016.

Fred G. Chin, '56 MD, '57 GME, of Santa Cruz, Calif., died Nov. 6, 2015.

George C. Chipain, '59 DDS, of Elmhurst, Ill., died July 8, 2015.

Henry C. Cleveland, '48 MD, of Denver, died Jan. 13, 2016.

James B. Conner, '55 MD, '61, '63, '64 GME, of Sun City West, Ariz., died Feb. 15, 2015.

Edward K. Connors, '44 MD, of Palm Desert, Calif., died Dec. 21, 2015.

Trevert L. Couden, '58 MD, of Loudon, Tenn., died Dec. 24, 2015.

Chester L. Dangremond, '52 DDS, '61 MS, of Santa Rosa, Calif., died Aug. 22, 2015.

Miepje Agatha De Vryer, MD, '71 GME, of Evanston, Ill., died July 21, 2015.

Marie C. Duncan, '51 MD, '57 GME, of Wakefield, R.I., died Jan. 16, 2016.

Norman J. Duncan, '52 DDS, of Holden Beach, N.C., died July 7, 2015.

Carroll M. Elmore, '47 MD, of Payson, Ariz., died Dec. 12, 2015.

Robert A. Esser, '45 MD, '46 GME, of New York City, died June 16, 2015.

Ralph B. Foley, '61 MD, of Ogden, Utah, died Feb. 1, 2016.

Trygve O. Fortun, '47 DDS, of Seattle, died July 26, 2015.

Per Freitag, MD, PhD, '78 GME, of Springfield, Ill., died Feb. 6, 2016.

Alan W. Grantham, '53 MD, of Abingdon, Va., died April 7, 2015.

Raymond W. Grassa, '56 DDS, of La Jolla, Calif., died Aug. 20, 2015.

Catherine Grimes, '04 DPT, of Scottsdale, Ariz., died Jan. 24, 2016.

W. James Guthrie, '54 MD, of Douglassville, Pa., died June 20, 2015.

Charles A. Haerter, '65 MD, of Lake Havasu City, Ariz., died Dec. 8, 2014.

Jaroslav D. Hoobchaak, '79 DDS, of Barrington, Ill., died Aug. 2, 2015.

Alfred Jaffe, '53 DDS, of Potomac, Md., died May 2, 2015.

Robert A. Karp, '91 MD, of South Orange, N.J., died Feb. 5, 2016.

Alda Kendall, '49 CERT, of Bellevue, Iowa, died Jan. 26, 2016.

Miroslau Kolenskyj, '63 DDS, of Downers Grove, Ill., died Aug. 24, 2015.

George A. Kremers, '47 MD, of Greenwood, Ind., died July 13, 2015.

Melvin G. Leavitt, '55 DDS, of San Diego, died Sept. 6, 2015.

Wishard S. Lorimer Jr., '44 MD, of Fort Worth, Texas, died Jan. 9, 2016.

Charles L. Milone, '51 DDS, of Durham, N.C., died June 20, 2015.

Eugene B. Orgeron, '52 MD, of Port Neches, Texas, died Jan. 24, 2016.

William O. Owen, '56 MD, '61 GME, of Fresno, Calif., died Feb. 5, 2015.

Carlisle K. Parker Jr., '57 MD, of Vero Beach, Fla., died April 5, 2015.

Richard O. Petty, '70 DDS, of Ogden, Utah, died June 30, 2015.

James L. Platts, '59 DDS, of Pine- dale, Wyo., died Aug. 6, 2015.

Bernard L. Portnoy, '53 MD, of Bethesda, Md., died Dec 9, 2015.

Randolph A. Rovelstad, '44 MD, of Rochester, Minn., died Dec. 11, 2015.

Donald H. Singer, '54 MD, of Wilmette, Ill., died Feb 14, 2016.

Arthur J. Slater, '47 DDS, of Kalispell, Mont., died June 23, 2015.

Thomas J. Thomas, '41 DDS, of Pinehu- rst, N.C., died July 23, 2015.

Hubert Van De Voorde, '52 DDS, of Clermont, Fla., died Sept. 23, 2015.

Edwin C. Wait, '43 DDS, of Rogers, Ark., died Sept. 20, 2015.

Quentin D. Young, '48 MD, of Chicago, died March 7, 2016.

Yvonne Ziadie, '55 CERT, of Houston, died Jan. 19, 2016.

Upcoming Events

JUN

JUNE 20, 2016

["Heritable Disorders of Connective Tissue" Rheumatology Fellows Lecture,](#) Calvin Brown, MD

Northwestern Memorial Hospital, Galter Pavilion, 14th Floor Boardroom, 675 N. St. Clair Street, Chicago. For more information, call 312-503-8003.

JUL

JULY 7-9, 2016

[5th Annual Chicago Cardiovascular Update](#) Gallery at GreenRiver, Lavin Pavilion, 18th Floor, 259 E. Erie Street, Chicago. For more information, call 312- 503-8533.

JULY 15, 2016

[Division of Plastic Surgery – Aesthetic and Business Curriculum Meeting](#) Robert H. Lurie Medical Research Center, Hughes Auditorium/Ryan Atrium, 303 E. Superior Street, Chicago. For more information, call 312-926-8060.

AUG

AUGUST 5, 2016

[Advances in Pulmonary Hypertension](#) Gallery at GreenRiver, Lavin Family Pavilion, 18th Floor, 259 E. Erie Street, Chicago. For more information, call 312-503-8533.

AUGUST 19, 2016

[Cerebrovascular Case Conference](#) 14th Floor, Radiology Conference Room, 676 N. St. Clair Street, Chicago. For more information, call 312-926-7720.



'Father of Transplantation'

Thomas E. Starzl, '50 MS, '52 MD, PhD, and '82 H, performed the world's first successful human liver transplant at the University of Colorado in 1967. A pioneer in organ transplantation, Starzl advanced the field from refining the surgical principles that made it possible to insert a new liver to introducing the use of immunosuppressants to prevent organ rejection. In 1980, he established the clinical utility of cyclosporine and nine years later, the first-time use of a more effective anti-rejection agent, FK-506 (tacrolimus). Today this Northwestern alumnus remains active in research at the University of Pittsburgh, where the institution's renowned transplantation institute is named in his honor. His current work focuses on transplant tolerance and chimerism – the coexistence of donor and recipient cells (See p. 18 for a feature on Northwestern Medicine's innovative efforts in this area.). Read more about this notable alumnus in the magazine's history blog at magazine.nm.org.

Reducing EM Resident Burnout

Studies continue to show that doctors in training suffer high levels of stress and depression. Hoping to reverse this trend in emergency medicine (EM), the Northwestern University EM Wellness Committee will be investigating the impact of specific wellness initiatives on Northwestern residents in the department.

In January, EM chief resident Kory Gebhardt, MD, was named the winner of a nationwide competition for the best EM wellness ideas. ALiEM (Academic Life in Emergency Medicine), a blog dedicated to discussing best practices in the specialty, awarded Gebhardt a grant underwritten by EBSCO Health/DynaMed Plus.

Northwestern's EM Wellness Committee plans to measure the influence of formal education programs, small group workshops and extracurricular team-building activities on preventing resident burnout.

Gebhardt's project team includes third-year residents Carrie Pinchbeck, MD and Logan Weygandt, MD, MPH. Dave Lu, MD, '10 GME, MBE, serves as faculty advisor.

Medical Students Launch Learning App

Three second-year students have developed a test question bank to enhance team-based learning and encourage classmates to teach one another, especially during the early critical years of medical school. Dubbed "SynapseGarden," the online app allows students to submit, share and practice test questions to study and better understand their coursework.

"The idea came up when I had been searching for questions but found none that were specific to Feinberg material," explains Anthony Gacita, who is enrolled in the Medical Scientist Training program. Gacita enlisted the help of classmates Tasmeen Hussain and Matt Antalek, whose backgrounds in math and computer science came in handy. He and his partners created a free-of-charge app that streamlines the submission and storage of test questions and then crowdsources the process of approving questions.

The app involves a login account so that students can track their progress as well as correct questions others have posed. Users are required to explain not only why answers are correct but also why other answers are incorrect.

The enterprising app developers hope SynapseGarden endures to future classes. Says Gacita, "We would also love to eventually get faculty to contribute."



APP DEVELOPERS (FROM LEFT) MATT ANTALEK, TASMEEN HUSSAIN AND ANTHONY GACITA CREATE QUESTIONS AND ANSWERS FOR BETTER LEARNING.



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