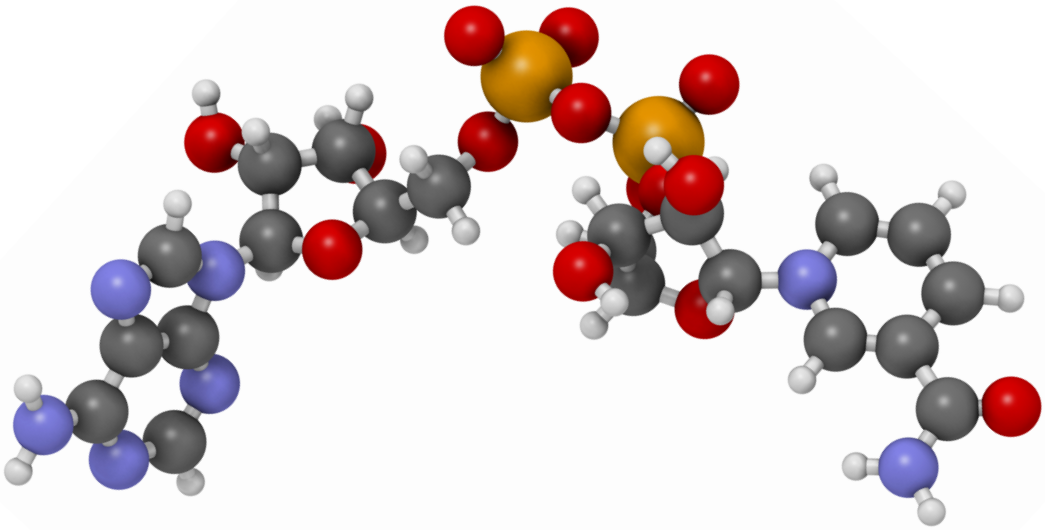
Breakthroughs

Feinberg School of Medicine Research Office

February 2017



As part of his research on the body's circadian clocks, Joseph Bass, MD, PhD, is investigating the molecule NAD+, which is central to the mechanism that connects life span and aging to nutrition.

Uncovering Metabolism's Clockwork

"Timing is everything" may be an old cliché, but for Joseph Bass, MD, PhD, it's also a reflection of an emerging discovery in physiology: that the body's circadian clocks are in fact critical to driving a host of behaviors, processes and pathways — including those associated with several diseases and pathologies.

Bass, chief of Endocrinology, Metabolism and Molecular Medicine in the Department of Medicine, focuses his research on illuminating how the body's clocks regulate feeding behavior and glucose metabolism, and identifies how disruptions in that overarching circadian system play a role in metabolic disease. The goal of the research is to develop a deeper understanding of the clock and its mechanisms, which may eventually lead to novel therapies for widespread disorders like obesity and diabetes.

"The field of circadian time has been an area of excellence at Northwestern for more than 20 years," said Bass, also the Charles F. Kettering Professorship of Medicine and a member of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University. "What we're trying to do now is take advantage of our know-how to identify new pathways and drugs for those pathways that could, for example, augment insulin secretion and improve diabetes."

It's long been known that the body possesses a master circadian clock, located in the brain, in the suprachiasmatic nucleus of the hypothalamus. But it wasn't until more recently, as the field of circadian time rapidly advanced, that it was discovered there are also distinct clocks residing in nearly every cell of the body.

The master clock — cued by internal factors and environmental signals like light — holds the rhythm across all the body's peripheral clocks, regulating behavior and biological processes throughout the 24-hour light-dark cycle. But when individual clocks fall out of tune with the master timekeeper, the breakdown in synchronization can contribute to a range of disorders, including diabetes.

"My focus has increasingly been drawn toward understanding the perspective of time as a variable in biochemical processes that determine our drive to eat — in turn affecting bodyweight — and regulate blood sugar control," Bass said.

Bass, who joined Northwestern in 2000, arrived at an opportune time in the history of circadian clock discovery. Seminal work in the late 1990s by Fred Turek, PhD, professor of Neurology and Psychiatry and Behavioral Sciences, and Joseph Takahashi, PhD, a former professor of Neurology, for the first time pinpointed — and cloned — the genes that drive circadian function in mammals.

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Northwestern Medicine®

Uncovering Metabolism's Clockwork

(continued from cover page)

"There was this intersection of critical developments at Northwestern that really opened the field," Bass said. "The collaborative environment then enabled me to join together my background in endocrine, metabolic and medical physiology with these powerful strategies from genetics to try to understand how the clock regulates behaviors and physiologic systems."

In a landmark paper published in *Science* in 2005, Bass, together with Turek and Takahashi, demonstrated that a misaligned biological clock impaired metabolism, increasing the prevalence of obesity and metabolic syndrome. In the study, mutant mice with a dysfunctional clock gene experienced a 35 percent increase in fat mass compared to wild-type mice.

"The paper was the first to provide genetic evidence that the clock system regulates both body weight and glucose metabolism; that was key," said Bass, who is also co-director of the Center for Diabetes and Metabolism and of the Comprehensive Metabolic Core.

Numerous breakthroughs in the metabolism-clock connection followed over the next 15 years of Bass' tenure at Northwestern. In *Nature* in 2010, Bass and his team first reported that beta-cells in the pancreas require a clock in order to produce insulin. In a subsequent study building upon those findings, Bass' laboratory, together with co-investigator Grant Barish, MD, used next-generation genome sequencing to pinpoint the precise set of genes in the pancreas that are controlled by the clock transcription factors. The findings were published in *Science* in 2015.

"Joe has really been a leader in establishing a very direct connection between the circadian clock and diabetes," said Barish, assistant professor of Medicine in the Division of Endocrinology, Metabolism, and Molecular Medicine. "Particularly in this most recent study, the discovery of the underlying regulatory mechanism by which the circadian clock controls the secretion of insulin — the principle hormone

Joseph Bass, MD, PhD, is the chief and Charles F. Kettering Professor of Endocrinology in the Department of Medicine at Feinberg.

responsible for glucose homeostasis — really cements a link between the clock and aspects of insulin, diabetes and related physiology."

The anticipation is that such fundamental discoveries may eventually inform the development of novel therapeutics for diabetes and other diseases. "While we're still very early in this, we know that some features of these circadian transcription factors are targetable and, to some extent, are amenable to pharmacologic manipulation," Barish said.

Bass' findings also have applications for the treatment of a wider range of disorders, as the body's metabolism of drugs is in part influenced by the circadian system, an area of study called chronopharmacology. For example, statins are largely administrated at night because the clock coordinates the synthesis of cholesterol to occur at night. "It's likely that this is just the tip of the iceberg, and that there are many other processes targeted with drugs that are controlled by the same clock mechanism," Bass said.

In ongoing research, Bass' laboratory is also striving to uncover how the clock helps regulate production of a key molecule called NAD+. The connection was first reported in a pair of papers Bass published in *Science* in 2009 and 2013, with first author Kathryn Ramsey, PhD, and first author Clara Peek, PhD, respectively, both research assistant professors of Medicine in the Division of Endocrinology, Metabolism, and Molecular Medicine.

"NAD+ has been shown to be central to the mechanism that connects life span and aging to nutrition. We're now trying to understand how it is that nutrition and clocks influence aging, and we think one of the ways this comes about is through the control of NAD+," Bass said. He is collaborating with colleagues in chemistry, including Milan Mrksich, PhD, professor of Cell and Molecular Biology, and Navdeep Chandel, PhD, David W. Cugell Professor of Medicine and of Cell and Molecular Biology, to address such questions.

"Interactions with other groups at Northwestern have enabled us to make key advances in our understanding of the clock and in how it's controlling other physiologic systems," Bass said. "Because of the history of discoveries here, we're now in a position to be on the ground floor in using genetic approaches to get at questions that have been asked for a long time in a more descriptive way."

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What Drives Chromosome Segregation & Epigenetic Inheritance?

Daniel Foltz, '01 PhD, associate professor of Biochemistry and Molecular Genetics

As a graduate student at Northwestern, Daniel Foltz, '01 PhD, fell in love with studying cell division. Now an associate professor of Biochemistry and Molecular Genetics, he studies chromosome instability, a hallmark of cancer, and the epigenetics behind autism.

"Because of the dramatic morphological changes that occur in the cell during division, this process has been studied for over 100 years," Foltz said. "But we are only recently starting to know the basic biochemical and molecular processes that drive chromosome segregation so that we can fully understand how this process occurs."

Q&A

What are your research interests?

My research interests focus on understanding the molecular mechanisms that ensure proper chromosome segregation during cell division. Chromosome segregation is orchestrated by the centromere, which is a unique locus present on each chromosome. The task of developing a human adult from a single cell requires trillions of cell divisions. Errors in chromosome segregation can lead to birth defects. Later in life, most cancers have too many or too few chromosomes in a cell, a state called aneuploidy. This shuffling of chromosomes (and segments of chromosomes) allows cells to acquire the unique characteristics of cancer cells that allow them to proliferate almost unchecked.

More specifically, our lab is interested in how the location of the centromere is determined on each chromosome. DNA sequence does not dictate its location, instead a poorly determined epigenetic mechanism establishes the centromere locale that relies on a centromere-specific nucleosome containing the histone H3 — variant CENP-A. Centromere identity of a locus is inherited across cellular generations. Therefore, assembly of centromere chromatin is a key step to maintaining centromere identity and ensuring proper chromosome segregation. Our work has identified the proteins required for CENP-A assembly and understanding how these proteins work together to ensure the epigenetic inheritance of centromeres and thus proper segregation of chromosomes.

Also, we are studying the epigenetic underpinnings of autism. In autism there are a few recurrent gene mutations, which account for only a small subset of autisms cases. Many de novo DNA mutations in different genes have been identified that are associated with autism. If you look at the function of the genes affected by these de novo mutations, several fall into the class of epigenetic modifiers. We are working to learn the functions of some of these modifiers with the hope of understanding common epigenetic mechanisms that may be perturbed in autism.

What is the ultimate goal of your research?

Our goals are two-fold in the lab: to understand the basic mechanisms that drive chromosome segregation and epigenetic inheritance and to identify the role of chromosome mis-segregation in cancer as a causative process and potential therapeutic target.

How did you become interested in this area of research?

As a graduate student at Northwestern, I was studying Notch-Delta signaling and raised several antibodies against Notch to study its localization in the brain. Unfortunately, my antibody cross-reacted heavily with a microtubule associated protein, so the first time I looked at cells stained with the antibody, I saw these fantastic microtubule spindles in the cells undergoing mitosis. While I failed to make a good Notch antibody, I fell in love with the beauty of cell division. As I begin to delve into the literature of chromosome segregation, I realized the epigenetics of centromere specification was an exciting puzzle that I wanted to solve.

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13TH ANNUAL LEWIS LANDSBERG RESEARCH DAY

Call for Abstracts

Submission Deadline

Wednesday, March 1 at 11:59 p.m.

Research Day is Thursday, April 6 , from 1 to 5 p.m. on the Chicago campus.

This event features a poster competition open to researchers in the following categories:

- Faculty
- Graduate students
- MD-PhD students
- Medical students
- Postdoctoral researchers and fellows
- Clinical residents and fellows
- Research staff

Those interested in participating in the 2017 event must submit an abstract online no later than 11:59 p.m. Wednesday, March 1, at feinberg.northwestern.edu/abstracts

Space is limited and will be assigned on a first-come, first-serve basis.

For more information, please contact the Feinberg Research Office, 312-503-1499 or researchday@northwestern.edu

Examining a Toxic Foodborne Bacterium

Hannah Gavin, Driskill Graduate Program in Life Sciences

Hannah Gavin, a fifth-year student in the Driskill Graduate Program (DGP) in Life Sciences, studies a foodborne bacterium called Vibrio vulnificus in the laboratory of Karla Satchell, PhD. According to the Centers for Disease Control and Prevention, bacteria in the Vibrio genus are responsible for the illness Vibriosis, which causes an estimated 80,000 illnesses and 100 deaths in the United States every year. People with vibriosis are infected after consuming raw or undercooked seafood or exposing a wound to seawater.

Q&A

Where is your hometown?
Growing up I lived in five different states, so in many ways "home" is wherever my family is located. Geographically speaking, I consider myself North Carolinian. I was born in North Carolina and returned to complete my undergraduate degree at the University of North Carolina in Chapel Hill.

What are your research interests?
I am interested in all things digestive, perhaps because I like food so much. I'm amazed that our bodies are able to absorb and utilize different nutrients while simultaneously protecting us from food contaminates. I am also excited about microbes and their influence on the world. Even though they are invisible to the naked eye, microbes have a huge role in shaping the health of the planet and its inhabitants.

What exciting research projects are you working on?
Our bodies excel at protecting us from most illnesses, but sometimes microbes still get the best of us. I study a foodborne bacterium called Vibrio vulnificus — a microbial cousin of the bacteria that causes cholera — and a toxin made by these bacteria. In our lab we are trying to understand different functions of the toxin and how these functions make Vibrio vulnificus infections dangerous. Read an article I wrote about Vibrio vulnificus for *Discover Magazine* here.

What attracted you to the DGP?
In applying to DGP, my attraction was Northwestern's great research and the umbrella-program structure of the DGP, which meant I was able to try rotations in different labs without being limited by departmental boundaries.

In choosing DGP, it was the people. Faculty and staff here are undoubtedly excellent, but it was actually the character of my interview peers that convinced me Northwestern was the place to be. When it came to decision time, I reasoned that it was pretty important to like the people I would be studying and researching alongside for the next six years. As I've faced the inevitable highs and lows of graduate school, I've been grateful to my past self for that reasoning, it really helps to be in good company.

What has been your best experience at Feinberg?
This past spring I presented my research at the Vibrios conference in coastal France. It was my first time traveling to Europe and my first time speaking at a scientific meeting. This experience wasn't at Feinberg, per se, but it was made possible by my research and support from my department.

How would you describe the faculty at Feinberg?
Studying in the department of Microbiology-Immunology, I hold these faculty members in particularly high regard. They expect me to perform thoughtful, rigorous science and over the past four years they have helped me develop the skills and mentality to do just that.

What do you do in your free time?
Chicago is home to an awesome folk music and dance scene. When I'm not working on science-related tasks, I am usually connecting with my Appalachian roots by playing or dancing to fiddle tunes. I also spend time combating my city-derived nature deprivation with community gardening, biking and trips into the wilder parts of the USA.

What are your plans for after graduation?
More science! I'm planning to do postdoctoral research. I'm pretty hooked on microbiology, but I'm looking to move outside of pathogenesis (disease) research to study microbes from another angle. I am considering a cooperative/beneficial bacterial-host relationship, or the role of microbes in environmental processes. It's also important to me to find a job that values science communication and outreach, because I enjoy writing and talking about science almost as much as I like doing it. Read some of my work for *Helix Magazine* here.

Connect with Hannah on LinkedIn.

Supporting NUIN Faculty and Students

Chernise Bailey-Turner, Program Assistant, Northwestern University Interdepartmental Neuroscience (NUIN) Program

Q&A

Where are you originally from?
I was born and raised in Chicago.

What is your educational background?
I received a bachelor's degree in business administration from Illinois State University.

Tell us about your professional background.
After college, I worked in property management where I helped manage several Chicago Housing Authority properties. I also worked with a non-profit agency where I helped with tutoring, job training and placement for underprivileged adults striving to re-enter the workforce. Most recently I worked at University of Chicago in higher education and healthcare administration before joining the NUIN program.

Why did you choose to work at Northwestern?
Northwestern appealed to me, as it offered the opportunity to further develop my professional experience in higher education administration. Northwestern's commitment to a healthy work/life balance has also been very appealing.

What is your favorite part of the job?
Working at Northwestern allows me to connect with students, faculty and colleagues from all walks of life, which promotes enlightening conversations, friendly debates and valuable knowledge.

How do you help scientists and/or research students at the medical school?
My effort consists of providing the day-to-day administrative and operational support to faculty and students starting with admissions through graduation, and everything in between. I also support NUIN's faculty and student leadership by ensuring they have access to the resources they need.

What exciting projects are you working on?
Throughout the year I coordinate logistics for professional development programs, retreats, workshops, educational courses and seminars for students, faculty and invited guests. Currently, I am working on the logistics for our upcoming recruitment and admissions season. It's always stimulating to meet students from around the world with diverse experiences. I'm also working on developing our social media platforms to allow for better communication, outreach, marketing and recruitment.

What do you like to do in your spare time?
My spare time is spent making memories with my husband and children. I enjoy going to different music and cultural festivals and spending time with my girlfriends. Meeting regularly with my local SEED group and volunteering with black youth mentoring programs are also passions I look forward to doing more of in my spare time.

Welcome New Faculty

Paul DeCaen, PhD, joins as assistant professor of Pharmacology. His area of expertise includes exploration of ion channel regulation. His team specifically looks at how dysregulation of ions are associated in autosomal polycystic kidney disease and forms of epilepsy. Previously, he was a postdoctoral research fellow in neuroscience at Harvard University and a Hughes fellow at Howard Hughes Medical Institute. DeCaen earned his PhD in Pharmacology from the University of Washington. He then completed postdoctoral training at the Boston Children's Hospital in Cardiology. He is the principal investigator on a National Institutes of Health K99/R00 grant and has published more than 12 peer-reviewed journal articles.

Research in the News

NPR, December 6

New Guidelines Tell Parents When To Introduce Babies to Peanut Products
Ruchi Gupta was quoted.

Chicago Tribune, January 6

Apps Cut Depression and Anxiety Symptoms By Half, Northwestern Study Says
David Mohr was quoted.

- This research was also featured in *Fox News* and *Yahoo!*

Yahoo!, January 10

Why You Should Let Your Partner Check You for Skin Cancer
June Robinson was quoted.

TIME Magazine, January 12

You Asked: What's the Best Sleeping Pill?
Phyllis Zee was quoted.

- This research was also featured in *Yahoo!*

Chicago Tribune, January 18

As Food Allergies Spread, a Push to Raise Awareness Among Students
Ruchi Gupta was quoted.

Chicago Tribune, January 18

Northwestern to Co-lead Immunotherapy Drug Trial for Rare Cancers
Frank Giles was quoted.

TIME Magazine, January 18

How to Cure Chapped Lips
Roopal Kundu was quoted.

More media coverage available online.

Northwestern University
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NUCATS Corner

Expand Your Clinical Research Knowledge with Online Training

Stay up-to-date on the latest practices in clinical and translational science research with online courses available through NUCATS. The Introduction to Clinical Research Online Modules includes five, one-hour courses designed to provide clinical research coordinators and research support staff with knowledge of key areas in research.

Courses include:

- Introduction to Clinical Research provides a general explanation for clinical research including billing, research misconduct and human subjects protection.
- Human Subjects Protections explains the role of the IRB in research, what protections are available for human subjects and how to administer informed consent.
- Clinical Research Billing covers best practices to minimize the risk of improper billing, the role of Medicare in covering clinical trials cost and the difference between patient and clinical research billing.
- Research Misconduct discusses types of research misconduct and how to report misconduct in compliance with federal regulations.
- Good Clinical Practice describes clinical research protocol, data collection and clinical trial development.

Each course is $39.99 or all five courses can be purchased for $149.95. Register online. Contact NUCATS Center for Education and Career Development with questions.

Sponsored Research

PI: Mary McDermott, MD, Jeremiah Stamler Professor of Medicine, General Internal Medicine and Geriatrics

Sponsor: National Heart, Lung, and Blood Institute

Title: "Improve PAD PERformance with METformin. The PERMET Trial"

People with lower extremity peripheral artery disease (PAD) have walking difficulty and increased rates of mobility loss, but few effective medical therapies are available. Recent evidence suggests that metformin, an oral medication used to lower blood sugar levels in patients with Type 2 diabetes, has therapeutic properties that target the vascular and calf skeletal muscle impairments associated with walking impairment in PAD. McDermott's team is proposing the first clinical trial to study whether metformin improves lower extremity functioning in PAD.

They are planning a placebo-controlled double-blind randomized clinical trial to establish whether metformin (2,000 mgs daily) improves and/or prevents decline in walking performance in people with PAD. Participants will be 212 people with PAD who do not have diabetes mellitus, since metformin is a first-line therapy for Type 2 diabetes.

Read more about the project.

PI: Sergejs Berdnikovs, Research Assistant Professor of Medicine in the Division of Allergy and Immunology

Sponsor: National Institute of Allergy and Infectious Diseases

Title: "Hormones in Allergic Disease"

Epithelial barrier dysfunction has been implicated as central to initiation and propagation of multiple allergic diseases. By conducting comparative bioinformatics analysis of epithelial gene expression in different allergic diseases, Berdnikovs' team made striking preliminary observations about unexpected hormonal imbalances associated with common epithelial dysfunction in allergy, which was further validated by detection of significant changes in levels of insulin, growth hormone, triiodothyronine and several other hormones in the plasma of allergic patients.

This proposed study will test the connection between hormonal changes and epithelial dysfunction in asthma, atopic dermatitis and food allergy, which represents an overlooked systemic mechanism unifying these diseases in a way that has the potential to be transformative to the field of allergy-immunology.

Read more about the project.

Feinberg Research Retreat Planned for Feb. 14

In an effort to define Feinberg's strategic research plan for the next five years, a research retreat will be held Feb. 14 at Fairmont Chicago, 200 North Columbus Drive.

More than 400 principal investigators have been invited to attend. They will participate in tabletop exercises on the topic of areas of strategic growth and will then be asked for ideas on infrastructure, tools and technologies needed to reach new goals.

"It's our PIs chance to give input into the strategic research plan," said Rex Chisholm, vice dean of Scientific Affairs and Graduate Education. "The last research retreat was in 2012, and we are excited to hear new and novel ideas from our faculty."

The all day event starts at 8:30 a.m. and ends at 5:00 p.m.

Exploring Chromosome Segregation

(continued from page 3)

How is your research funded?
Our work on chromosome segregation has been funded by a variety of agencies. We were supported by a Basil O'Connor award from the March of Dimes, based on the role of chromosome mis-segregation in generating birth defects. The American Cancer Society supported our work in understanding how the histone chaperone contributes to centromere identity through a research scholar grant. Recently, our work on centromere specification and posttranslational modifications of the centromere are supported by an R01 from the NIGMS. Preliminary work identifying UBR7 as a chromatin reader was supported by the National Institute of Child Health and Human Development for its potential to elaborate pathways involved in autism.

Who inspires you?
My 9-year-old son, Sam, is a great inspiration to me. We hope the experiments we do in the lab will help people live better lives in the near future, and I want to be sure that we make it better for his generation. He is also a taskmaster. When I tell him about an experiment we are in doing the lab, he wants to know the outcome, and he will ask me, for weeks, how the experiment turned out. So he keeps me motivated too!

What do you enjoy about teaching/mentoring young scientists in the lab?
The trainees are the heart and soul of the lab. I enjoy the unique perspective that each trainee brings to our research efforts. It's those moments of synergy between lab members that gives me the most satisfaction — when you know the discussions and interactions in the lab fostered an insightful new idea or realization, as well as sharing those "aha" moments with the trainees that come from hard work and deep thought.

Feinberg Rises in NIH Rankings

Northwestern University Feinberg School of Medicine rose to 16th place among U.S. medical schools in funding from the National Institutes of Health (NIH) in 2016. These rankings are reported annually by the Blue Ridge Institute for Medical Research.

Individual departments at Feinberg also ranked highly in the report: Twelve departments ranked among the top ten in their specialty for NIH funding, while an additional two ranked in the top 20. Read more.

Funding

Policies for Action: Policy and Law Research to Build a Culture of Health (P4A)

More information

Sponsor: The Robert Wood Johnson Foundation

Submission deadline: March 10 (3 p.m. ET)

Upper Amount: $250,000

Synopsis: Research shows universal preschool education would give all children a boost to live a healthier life. There are potentially many more supportive policies-help discover laws and regulations that would help support better community health. Two million dollars in research funding is available through the Policies for Action call for proposals, including $500,000 for research on actionable policies that support children's healthy weight or reduce child obesity.

NINDS Research Program Award (R35)

More information

Sponsor: National Institute of Neurological Disorders and Stroke

Submission deadline: March 21, by 5:00 p.m.

Upper Amount: $750,000 per year

Synopsis: The purpose of the NINDS Research Program Award (RPA) is to provide longer-term support and increased flexibility to Program Directors (PDs)/Principal Investigators (PIs) whose outstanding records of research achievement demonstrate their ability to make major contributions to neuroscience. RPAs will support the overall research programs of NINDS-funded investigators for up to 8 years, at a level commensurate with a PD/PI's recent NINDS support.

McKnight Endowment Fund for Neuroscience: McKnight Memory and Cognitive Disorders Award

More information

Sponsor: The McKnight Foundation

Submission deadline: March 1, 2017

Upper Amount: $100,000 per year for three years

Synopsis: Request for proposals that address memory or cognition under normal and pathological conditions. This includes proposals that address mechanisms of memory or cognition at the synaptic, cellular or behavioral level in animals, including humans.

View more funding opportunities

Tips for Effective Scientific Writing

Like it or not, scientists are writers. Communicating your results is one of the most important parts of the research process, but it's easier said than done. Here are a few tips to keep in mind as you write. These examples are tailored to writing for publication in a journal, but can be applied to other projects as well.

Audience

When writing, it is important to remember your audience. If writing for publication in a journal, your writing style will be different than if you were writing for your colleagues. As a general rule, write as if you are communicating with someone who is not an expert in your field. The writing will still be at a high level that requires specialized knowledge, but it should be free from jargon and euphemisms; terms that are vague or depersonalizing should be avoided in scientific writing.

Jargon/Euphemism	Preferred Form
expired, passed away, succumbed	Died
prepped	Prepared
Pap smear	Papanicolaou test

Simplify Your Writing

Scientific writing should be clear and concise. Reading takes energy and you want to make things easy for your readers. If they're distracted by inconsistencies in your writing or unnecessarily complicated sentences, they might lose sight of the bigger picture. Keep the same terminology throughout the paper, e.g. do not use the words participants, patients, and subjects interchangeably. Pick one and stick with it.

Here are some examples of common redundant phrases that can muddle your writing and add to your word count (redundant words are italicized).

Near *to*	Each *individual* participant
Outside *of*	Tender *to the touch*
Past history	*Major* breakthrough

Use the Active Voice

The AMA Manual of Style and journals like *Nature*, *Science* and *JAMA* recommend using the active voice because it is usually more clear, concise and direct. Don't be afraid to write in the first-person (I, we, our).

Passive	Active
An experiment was performed.	We performed an experiment.
A protocol was written by Dr. Jones.	Dr. Jones wrote a protocol.
It is believed by some researchers that restrictions must be placed on animal studies by the ethics committee.	Some researchers believe that the ethics committee must place restrictions on animal studies.

Title

Recommendations on title length vary, but, as a benchmark, the title should be no more than 12 words and should convey the main points of your work. Also, include key words you use in the abstract. Subtitles can be used but should only provide supplemental information. The main title should be able to stand alone. Phrases such as "effects of," "treatment of" and "role of" can often be eliminated from titles. Declarative statements and questions in titles are generally not used in scientific writing.

Avoid	Better
Effect of Smoking on Lung Cancer Risk	Smoking and Lung Cancer Risk
Fibromyalgia is Common in a Postpoliomyelitis Clinic	Prevalence of Fibromyalgia in Patients with Postpoliomyelitis Syndrome
Hospitalization for Congestive Heart Failure: Explaining Racial Differences	Racial Differences in Hospitalization Rates for Congestive Heart Failure

For more examples and resources, consult the AMA Manual of Style or view the GalterList on Writing and Terminology.

High Impact Factor Research

Gavvala JR, **Schuele SU**. New-Onset Seizure in Adults and Adolescents: A Review. *JAMA.* 2016 Dec 27;316(24):2657-2668.

Gill TM, Guralnik JM, Pahor M, Church T, Fielding RA, King AC, Marsh AP, Newman AB, **Pellegrini CA**, Chen SH, Allore HG, Miller ME. Effect of Structured Physical Activity on Overall Burden and Transitions Between States of Major Mobility Disability in Older Persons: Secondary Analysis of a Randomized Trial. *Annals of Internal Medicine.* 2016 Dec 20;165(12):833-840.

Green MJ, **Czerwiec MK**. Graphic Medicine: The Best of 2016. *JAMA.* 2016 Dec 27;316(24):2580-2581.

Hsieh CH, Shaltouki A, Gonzalez AE, da Cruz AB, **Burbulla LF**, St Lawrence E, Schule B, **Krainc D**, Palmer TD, Wang XN. Functional Impairment in Miro Degradation and Mitophagy Is a Shared Feature in Familial and Sporadic Parkinson's Disease. *Cell Stem Cell.* 2016 Dec;19(6):709-724.

Li R, Mansukhani ND, Guiney LM, Ji Z, Zhao Y, Chang CH, French CT, Miller JF, **Hersam MC**, Nel AE, Xia T. Identification and Optimization of Carbon Radicals on Hydrated Graphene Oxide for Ubiquitous Antibacterial Coatings. *ACS Nano.* 2016 Dec 27;10(12):10966-10980.

Park JK, Peng H, Katsnelson J, **Yang W, Kaplan N, Dong Y, Rappoport JZ, He C, Lavker RM**. MicroRNAs-103/107 coordinately regulate macropinocytosis and autophagy. *Journal of Cell Biology.* 2016 Dec 05;215(5):667-685.

Sathiyamoorthy K, Hu YX, **Mohl BS, Chen J, Longnecker R**, Jardetzky TS. Structural basis for Epstein-Barr virus host cell tropism mediated by gp42 and gHgL entry glycoproteins. *Nature Communications.* 2016 Dec;7:14.

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Help Feinberg Track Journals

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

Calendar

Friday, February 10

Cardiovascular Epidemiology Seminar Series

Phil Greenland

In this talk, Phil Greenland, MD, the Harry W. Dingman Professor of Cardiology at Feinberg, will provide insights from his many years of work as a journal editor, including his current role at *JAMA*.

Time: **11 a.m. to Noon**

Location: **680 N. Lake Shore Drive, Suite 1400**
Stamler Conference Room

Contact: Tyler.Seybold@northwestern.edu

More information

Wednesday, February 15

Autophagy and Mitochondrial Dysfunction in Cancer

Kay F. Macleod, PhD, assistant professor, Ben May Department for Cancer Research and Program Leader at the University of Chicago Comprehensive Cancer Center, Gordon Center for Integrative Sciences, will present "Autophagy and Mitochondrial Dysfunction in Cancer."

Time: **Noon to 1:00 p.m.**

Location: **Wieboldt Hall North Entrance, Room 408**
339 E Chicago Ave, Chicago

Contact: b-jaron@northwestern.edu

More information

Tuesday, February 21

Structures and Functions of the Clostridium difficile Toxins (CDI)

D. Borden Lacy, PhD, Vanderbilt University, will discuss recent progress in determining the structures and mechanisms of TcdA and TcdB, two toxins associated with CDI.

Time: **Noon to 1:00 p.m.**

Location: **Baldwin Auditorium, 303 E. Superior, Chicago**

Contact: k-satchell@northwestern.edu

More information

NIH News

Changes to the "Common Rule"

In an effort to better protect people participating in medical research, the federal government has issued a final rule, which updates the "Common Rule" provisions of protection that have governed how human subjects are used in research since 1991.

The general effective/compliance date of the final rule is January 20, 2018. According to the NIH website, studies that have not yet undergone initial IRB review will be subject to the new requirements on that date. Research ongoing on that date will continue to be subject to the current Common Rule requirements unless an institution chooses to comply with the final rule requirements for ongoing studies as well (these transition provisions are explained in the final rule preamble and appear in Section 101(l) of the regulatory text).

The single IRB requirement for multi-site studies takes effect three years later (January 20, 2020). The NIH policy on the use of single IRBs in multi-site studies takes effect in September of this year. HHS intends to issue further guidance on specific provisions of the rule.

NIH will be working with the Office for Human Research Protections in the coming months to develop additional guidance for the research community and, as necessary and appropriate, NIH will update relevant policies. Read more about the final rule here.

Online Seminars

The NIH Office of Extramural Research provides webinars on a variety of topics to help provide additional information on current or new policies and processes in a more interactive format for the extramural research community. Check out the most recent webinar: "Self-Evaluation & Reporting: Always Let the Guide be Your Conscience" presented by George Babcock of the University of Cincinnati. Browse the archive of recent webinars.

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