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Discover!

news from Brain Research Foundation

New Antidepressant Target Discovered by Brain Research Foundation Grantee

A Fay/Frank Seed Grant helps launch Dr. Dane Chetkovich's novel investigation using gene therapy to treat depression

Most existing antidepressants affect mood and emotions by increasing levels of neurotransmitters called monoamines, namely serotonin, dopamine and norepinephrine. But the fact that these drugs are not effective for many patients suggests there are additional mechanisms underlying depression yet to be uncovered that could be targeted with new therapies.

Support from BRF enabled Dr. Dane Chetkovich's lab at Northwestern University Feinberg School of Medicine to show that those mechanisms might involve the hippocampus, a region of the brain important for learning, memory and emotional regulation. There, they saw that changes to HCN channels, typically involved in controlling the electrical activity of cells in the heart and brain, also played a critical role in behaviors linked to depression.

Chetkovich's lab is now translating that insight into a potential gene therapy using mouse models. The researchers surgically inject mice with a nontoxic virus engineered to express a gene that turns off HCN channel function in hippocampus neurons.

"When the HCN channels stopped working, the mice behaved as if they'd been given antidepressant medications," Chetkovich explained.

To date, Dr. Chetkovich's team has been awarded three $40,000 BRF Seed Grants, enabling it to gather data leading to an additional **$1,960,638** in funding from the National Institutes of Health. **His achievement is an example of the importance—and success—of our early stage support.**

A 1:16 Return on Investment

$120,000 BRF Seed Grants

$1,960,638 Additional funding from NIH

BRAIN RESEARCH FOUNDATION
Innovate. Explore. Discover.

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Dear Friends,

This past fiscal year, which ended on June 30, was an extremely remarkable period for Brain Research Foundation (BRF). We supported more promising and innovative neuroscience research through our grant programs than ever before. This growth and progress could have only happened because of you, our visionary donors.

You generously supported our 2015 Discovery Dinner, making it the most successful benefit in our 63 year history! Your philanthropy tells us that BRF's mission of funding basic neuroscience research is something you believe in. And you realize that without funding the early stages of research most drug treatment therapies and eventual cures would not come to fruition.

Our cover story is an example of how the basic research you fund enables our scientists to uncover new potential treatments.

This newsletter's cover story, featuring Dr. Dane Chetkovich from Northwestern University, is a perfect example of basic research uncovering a potential treatment for a brain-related illness. Dr. Chetkovich's recent discovery, which was funded in part by a BRF Fay/Frank Seed Grant, has identified a novel antidepressant target. His research offers hope for those who are suffering from depression and are looking for a better treatment.

I am so proud to be part of an organization with such history and commitment to its mission. This is my 15th year in my role as Executive Director and the work that we do continues to excite and inspire me. I wholeheartedly believe in what BRF does and how we do it.

I also enjoy using my role at BRF to instill passion about research and our mission at the Foundation among younger aspiring scientists. This summer, we have three interns working with us and I hope I can inspire them to pursue their interests in science. As I talk to them I'm encouraged by their curiosity and enthusiasm and am gratified to see that future generations will continue to search for answers and solutions.

Thank you, our trustees and our donors, for your crucial role in this important quest.

Sincerely,

Terre A. Constantine, Ph.D.
Executive Director and CEO

A Remarkable 15 Years

"Fifteen years ago I was introduced to a smart, visionary young woman who had great plans for our Foundation. So I hired her."

—Tom Reynolds

In 2002, as President of the Board of Trustees, I wanted to make sure that the Foundation I was so passionate about had the leadership that would take it forward. When I met Dr. Terre Constantine I knew I found the right candidate.

Terre has propelled us in a way that would have excited our founders. Her 15-year anniversary has prompted me to reflect on some of the advancements the Foundation has achieved during Terre's tenure—advancements and possibilities that gained the admiration of our Trustees and enthused and gratified one of our late founders, Bill Fay.

Expanded impact:

- We've broadened our funding beyond Chicago and now support the best neuroscience research in the nation.
- Our Fay/Frank Seed Grants have grown from $25,000 for one year to $80,000 total for two years.
- Revenue from our annual Discovery Dinners has increased 10-fold, enabling us to continue to fund innovative research that is significantly expanding our understanding of the brain.
- Using findings from their Seed Grants, scientists have been able to access additional funding that translates to a 1:22 return on our initial investment.

New initiatives:

- We established our Scientific Review Committee, ensuring rigorous vetting of grant applications and the selection of the best proposals for funding.
- We're now funding experienced researchers with larger grants through our Scientific Innovations Awards.
- We were an early provider of outreach and education connecting traumatic brain injury (TBI) to sports concussions.
- We launched a research and educational initiative focused on the beneficial effects of exercise in reducing cognitive decline.

In addition to sustaining—and expanding—these accomplishments, we're also focused on the future. We're seeking to expand our profile, generating new contacts, engaging new Board members and spreading the word about BRF to new audiences.

Terre and the Board of Trustees will sustain the Foundation's legacy of vision, accountability and achievement. But we need your support to maintain this momentum. We hope we can count on you to ensure we have the funding to surpass our goals.

I look forward to the next 15 years with Terre and BRF. Please join me in continuing to support this remarkable organization and the amazing discoveries that we'll uncover.

—Tom Reynolds

Tom Reynolds and Terre Constantine, 2003

Awards Announced

We are pleased to announce the 2016 recipients of the Frederic A. Gibbs Discovery Dinner awards

Save the Date!

Thursday, October 13, 2016

Brain Research Foundation Annual Discovery Dinner

Ritz Carlton Chicago

Tickets are $500. Tables start at $5,000. To purchase tickets or buy a table, please visit http://www.pjhchicago.com/event/brf. For sponsorship opportunities or other questions regarding the event, please call Sandra Jaggi at 312.759.5157.

Martha and John Mabie

The Frederic A. Gibbs Discovery Award for Philanthropic Leadership

Martha and John Mabie have been dedicated supporters of BRF for over 56 years. Our co-founder William E. Fay, Jr. asked John to join the BRF board in 1960. John was taken with Bill's passion for BRF and finding treatments for diseases of the brain and nervous system. The two quickly formed a close friendship that lasted until Bill's passing in 2015. John continues to serve as the Chairman of the Honorary Board.

Martha and John are very active civically and established the John & Martha Mabie Public Health Research Fellowship at Northwestern University, which is designed to create student opportunities for research projects for implementation abroad or in the US. Because John's father suffered from Parkinson's disease, he established the William D. Mabie Professor in the Neurosciences, Neurology and Neurobiology, Pharmacology & Physiology at The University of Chicago.

Martha serves as Life Director of Horizon Hospice and Palliative Care, Chicago's first hospice and is a Life Trustee of Northwestern University. John is a Life Trustee of The University of Chicago Hospitals, a Trustee and past Chairman of the Hadley School for the Blind, a Trustee of the Millennium Park Foundation and a Director of the Golden Apple Foundation.

Blue Cross Blue Shield Association

The Frederic A. Gibbs Discovery Award for Community Service, accepted by Scott Serota, President and CEO

Scott Serota is president and CEO of the Blue Cross Blue Shield Association, a federation of 36 independent and locally operated Blue Cross and Blue Shield (BCBS) companies that collectively serve one in three Americans across every U.S. ZIP code. As the national leader of the BCBS System since 2000, he is a recognized expert throughout the industry, including with members of Congress and senior White House and other government officials, using his respected voice to advocate for a strong private market and implement the federal Affordable Care Act reform law effectively to best serve the American public.

Scott also has been a strong proponent of efforts to transform the healthcare delivery system— leveraging data and innovative models of care to ensure safer, more effective and affordable care in every community—as well as local investments tailored to the specific needs of every community. Through their deep local roots, the Blues have a unique perspective and unparalleled ability to strengthen communities by increasing access to care, improving healthcare quality and affordability and enabling healthier living.

This work dovetails well with the mission of Brain Research Foundation. "As someone who has committed his entire career to healthcare, I have a special appreciation for the terrific work Brain Research Foundation has enabled in this key clinical area over the past six decades," Scott said. "Looking ahead, I foresee more pioneering contributions from the Foundation that meet our organizations' shared goals: helping people get and stay healthy; preventing disease; and ensuring that all Americans get the right treatments at the right time."

Foundation Forward

Committed to ensuring the future of basic research, BRF introduces three young women to the challenges and joys of a career in science.

Many of you have heard about the critical role that science, technology, engineering, and mathematics (STEM) education plays in U.S. competitiveness and future economic prosperity. As part of our mission we are committed to educating the general public about neuroscience, and we also believe it's important to encourage and nurture talent.

Therefore, we are very pleased to welcome three interns to BRF from The University of Chicago Charter School: Woodlawn Campus. They're spending six weeks at BRF researching the funding of women scientists in neuroscience.

- Kirstin O'Neal became interested in science because her mother used to buy her science kits every Christmas, and in her freshman year she dissected a sheep's brain and became more interested in neuroscience.
- Taylor Philips' interest in neuroscience was sparked because of a field trip in her 9th grade biology class, where she got to witness an electroencephalograph up close. She wants to come up with innovative concepts to help people who suffer from neurological problems.
- Anya Smith watched NOVA programs after school and she actively reads books about the brain and diseases of the brain. She is very interested in learning more about the areas of the brain and their functions.

BRF Summer 2016 Interns from The University of Chicago Charter School. From the left, Anya Smith, Taylor Phillps, Kirstin O'Neal.

All three young women (who are rising sophomores) are excited to volunteer for a unique assignment, which is to help BRF with its "Women in Neuroscience: Reviewing the Gender Gap" study. They will gather data regarding the the funding of female scientists in neuroscience through the years. More specifically, they are reviewing BRF grant recipients to determine the ratio of male to female researchers throughout our grant programs. Their next step will be to examine data that identifies the gender of government funded grant recipients. We're eager to see how BRF and the National Institutes of Health (NIH) compare.

BRF is committed to supporting women in STEM. We'll be sure to share our interns' findings with you in our next newsletter.

"One of the things that I really strongly believe in is that we need to have more girls interested in math, science, and engineering. We've got half the population that is way underrepresented in those fields and that means that we've got a whole bunch of talent…not being encouraged the way they need to."

—President Barack Obama, February 2013

Lab Notes

BRF Continues to be the Venture Capitalists of Brain Research Through Our Fay/Frank Seed Grant Program

Since 1981, BRF has awarded almost $12.8 million to fund early stage research focused on innovative ideas.

Our Fay/Frank Seed Grants are offered on a competitive basis to accomplished neuroscientists in qualified research centers across the United States. Widely recognized as a mark of distinction, Seed Grants are highly prized and well-regarded.

Each grant candidate is nominated by his or her academic institution and is required to submit a detailed research proposal.

Proposals that meet grant requirements go on to peer review, a process that determines their relative scientific merit. The peer review process is conducted by BRF's Scientific Review Committee, a multidisciplinary panel of experienced neuroscientists.

After the reviewers evaluate and score the proposals independently, they share their findings and reach consensus on the most deserving proposals.

Established to help innovative neuroscience researchers gather the data required to validate their hypotheses, the BRF Fay/Frank Seed Grants are a critical first step in understanding neurological disorders. Since 1981, BRF has awarded almost $12.8 million to fund early stage research focused on novel ideas. By enabling scientists to generate the preliminary data required for major grants, the Foundation conservatively estimates that its investments have led to a factor of twenty times more funding for grantees and research.

We continue to receive many extraordinary proposals from across the country. This year, we funded twelve cutting-edge projects that are striving to understand the brain—the most complex organ in the body.

Rebecca M. Shansky, Ph.D.,
Northeastern University

To make things even more complex, studies suggest that there are differences in how some brain regions function in men and women. One Seed Grant project that BRF elected to fund looks at a very specific gender difference pertaining to fear and PTSD.

Although a majority of the population will experience a severe trauma at some point in their lifetimes, only about 10% of those people will go on to develop PTSD, which suggests that there are discrete neurobiological factors that confer susceptibility or resilience. Because PTSD is more prevalent in women, identifying sex-specific mechanisms of fear and emotion regulation is critical to the development of more personalized disease prevention and treatment.

Rebecca M. Shansky, Ph.D., Assistant Professor at Northeastern University, recently discovered that a subset of female rodents display an active fear response that is not observed in males. A better understanding of the neural circuits that mediate this novel behavior could lead to insight into what makes women susceptible to or resilient against PTSD. This Seed Grant project will begin to define the role of prefrontal cortex circuits in fear response strategies, and lay groundwork for future investigations into the cellular and molecular mechanisms that mediate the switch between active and passive fear responses.

Nenad Sestan, M.D., Ph.D.
Department of Neurobiology
Yale University

Dr. Nenad Sestan Elected to BRF's Scientific Review Committee

Dr. Sestan's research centers on understanding the molecular and cellular basis of how neurons acquire distinct identities and form proper synaptic connections in the cerebral cortex, the part of the nervous system involved in sensory-motor integration, higher-order cognitive functions, and emotional regulation. We also study how these complex developmental processes were modified during human evolution and may become compromised in neurodevelopmental disorders.

We are pleased to announce the 2016 BRF Fay/Frank Seed Grant Recipients

Kristen J. Brennand, Ph.D.
Icahn School of Medicine at Mount Sinai
Establishing a stem cell-based functional characterization of NRXN1-mutations from psychosis patients

Sreekanth H. Chalasani, Ph.D.
The Salk Institute for Biological Studies
Develop the sonogenetic method to manipulate the activity of mammalian neurons in vivo

Catherine A. Christian, Ph.D.
University of Illinois at Urbana-Champaign
Optoglial modulation of inhibition and seizure susceptibility

Yiyang Gong, Ph.D.
Duke University
Ultrafast optical recording of spiking activity in a zebrafish neural circuit

Ali Guler, Ph.D.
University of Virginia
Next generation magnetogenetic tools for manipulating neural activity

Myriam Heiman, Ph.D.
Massachusetts Institute of Technology
In vivo CRISPR screening for modifiers of mutant huntingtin levels
(Women's Council Recipient)

Alexander Jaworski, Ph.D.
Brown University
Somatosensory information processing through spinal commissural neurons

Kenneth Y. Kwan, Ph.D.
University of Michigan
Brain somatic mutations at ASD-associated genetic loci

Kira E. Poskanzer, Ph.D.
University of California, San Francisco
Lighting up astrocytes: neuromodulator activation in the cerebral cortex

Melanie A. Samuel, Ph.D.
Baylor College of Medicine
Decoding the molecular regulators of synaptic integrity

Rebecca M. Shansky, Ph.D.
Northeastern University
Chemogenetic dissection of sex-specific fear circuits

Oleksandr Shcheglovitov, Ph.D.
University of Utah
How does loss of SHANK3 in human neurons affect neuronal connectivity in the brain?

Brain Research Foundation Scientific Review Committee (SRC) was established to review our research grant applications. This committee is a combination of researchers from institutions nationwide. Their scientific expertise is invaluable when reviewing BRF research grant proposals.

2016-2017 Scientific Review Committee

Sangram S. Sisodia, Ph.D.
SRC Chair
Department of Neurobiology
The University of Chicago

Ted Abel, Ph.D.
Department of Biology
University of Pennsylvania

Scott T. Brady, Ph.D.
Department of Anatomy and Cell Biology
University of Illinois, Chicago

John F. Disterhoft, Ph.D.
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Northwestern University

Ole Isacson, M.D.
Department of Neurobiology
Harvard University

Daniel A. Peterson, Ph.D.
Department of Neuroscience
Rosalind Franklin University

Marina Picciotto, Ph.D.
Department of Psychiatry
Yale University

Nenad Sestan, M.D., Ph.D.
Department of Neurobiology
Yale University

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111 West Washington Street
Suite 1460
Chicago, Illinois 60602

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www.**youtube**.com/brainfoundation

9.8.16 Save the Date!

Putting Our Heads Together for Brain Research Foundation

Over 15 years ago, Lauren, Joe and Jonathan Shapiro's mom suffered a traumatic brain injury that left her severely mentally and physically disabled. Since then the siblings have realized that rare brain diseases are often feared and misunderstood. They want to help end that stigma by increasing awareness and understanding.

On Thursday, September 8th, Lauren Shapiro Mandel, Joe Shapiro, and Jonathan Shapiro invite you to "Let's Put Our Heads Together for Brain Research Foundation." All proceeds will benefit the Foundation.

Tickets include:
- Passed heavy appetizers
- A premium open bar
- Dessert from Firecakes and Sugar Bliss
- One raffle ticket

The Raffle will feature over 40 prizes from The Langham Chicago, Virgin Hotels, Second City, SoulCycle, GT Fish & Oyster, Shred415, Brooklyn Boulders, Beatrix, Revolution Brewing, and more! Additional tickets will be for sale at the event.

Thursday, September 8, 2016
6:30 pm to 8:30 pm

The Godfrey Hotel Chicago
127 W. Huron St., Chicago IL 60654

Tickets are $55 and available on Eventbrite.com or by calling 312.759.5150.