Newsletter of the
Brain Research Foundation
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brain waves

Brain Research Foundation

In This Issue

Human Pheromones

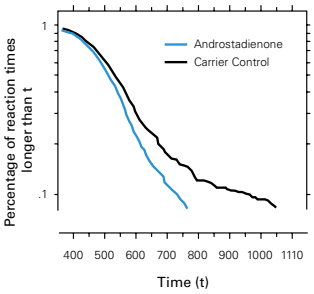


Figure 1 Graph shows reaction time data in social cognition task for negative pictures and high cognitive load.

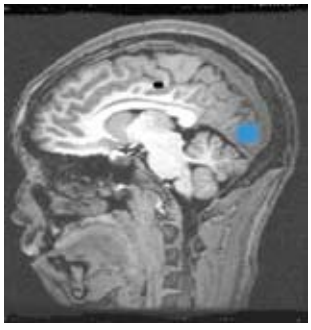


Figure 2 fMRI image shows comparison of normalized blood oxygen level-dependent responses between AND & control conditions during visual task. Blue voxels are greater in AND condition.

Dr. Martha K. McClintock, Professor of Psychology and Director of the Institute for Mind and Biology, was the first researcher to provide scientific evidence of human pheromones and their role in menstrual synchronization among women. Currently, her studies focus on the interactions between behavior and reproductive endocrinology.

The fundamental importance of human social behavior to mental and physical health necessitates a thorough understanding of its neurological mechanisms. Dr. McClintock has examined the impact of androstadienone (AND), a putative human pheromone found in male sweat, tears and skin, on mood, social cognition and visual processing, thereby acting as a social chemical signal among people without being consciously detected as an odor.

Her studies illustrated a difference in mood between AND- and control-treated individuals. Either AND in a clove oil solution or the solution alone was applied under the nose of participants. After several minutes, the subjects were then directed to fill out mood scales. With AND, women experienced an increase in positive-stimulated mood, when compared to control. Men, on the other hand, a more negative response with the presence of AND.

AND may specifically improve social cognition. When AND is present, both women and men could more quickly identify, under conditions of high cognitive or negative emotional load, human presence in a picture (figure1). AND also shows effect on visual cortex. Preliminary fMRI data revealed an enhanced activity in visual areas in an AND condition during a simple visual task (figure 2). This data suggests that AND can modulate neural activity following distinct rapid events.

Further fMRI studies will determine which brain circuits are affected by these social chemical: emotional processing, social cognition, or overall attention. Such information will benefit the study of emotions, social thought and behavior, and may provide a new avenue for viewing and treating social deficits (social phobia, autism, etc.).

dear friends

The past few months have been very busy in the Brain Research Foundation office. We have been gearing up for our gala scheduled for September 27, 2007. This year, we will be setting sail on Odyssey Cruises. It should be a fabulous time, so I hope you will mark your calendars now.

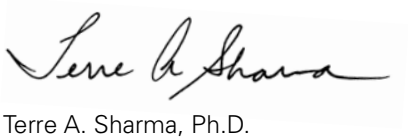
It's that time of year again when the Brain Research Foundation awards seed grants to neuroscientists. The fundamental notion of seed granting is to provide start-up money for innovative projects that have the potential of obtaining funding from additional outside sources. This program is one of the most important and productive funding initiatives the Brain Research Foundation conducts. Established at the request of the Fellows of the Brain Research Institute at the University of Chicago, this fund is named for BRF founders William E. Fay, Jr. and Clifton E. Frank.

This is an investment in scientific promise that pays off every year. Past recipients have been able to generate preliminary data that is published in top scientific journals, and most importantly, this data has enabled them to attract future grants *(see 2006 Seed Grant Facts on page 3)*. I hope you take a few minutes to read the article that illustrates some of the exciting experiments the 2007 BRF Seed Grant recipients will be performing to bring us closer to finding a cure for a variety of brain disorders.

In addition to the day to day workings of the office, we have been occupied by organizing an office move. The Executive Committee of the Brain Research Foundation has decided to relocate the BRF office from Hyde Park back to downtown Chicago. It was interesting to be near the science, but by moving our location downtown, we feel that it will be more accessible to our board and our donors.

If you are in the neighborhood, please stop by to see our new office.

Sincerely,



Terre A. Sharma, Ph.D.

Executive Director

Please make a note of our new address:

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Chicago, Illinois 60602

Phone (312) 759-5150
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Seed Grants: Growing Discovery

Dr. Robert Ho, Department of Organismal Biology and Anatomy

Dr. Adil Javed, Department of Neurology

For the past twenty-seven years, the Brain Research Foundation has been supporting neuroscientists through our annual Fay/Frank Seed Grant Program. These small seed grants are given to researchers to further explore their innovative ideas and promising investigative leads. The Brain Research Foundation makes this meaningful investment each year and each year the impact is remarkable.

In April, the Seed Grant Allocation Committee, comprised of senior scientists from the Brain Research Institute and members of the Brain Research Foundation, met to allocate $400,000 to 16 fellows of the University of Chicago's Brain Research Institute. Following are three summaries of the 2007 Seed Grant projects:

The incidence of autistic spectrum disorders has recently been estimated to be as high as one out of every 166 births. It has become generally accepted that autism, in its various forms, represents a genetic and developmental, rather than a psychological, disorder. While some recent progress has been made in the identification of autism susceptibility genes, very little is known about the functions of these genes during embryonic and neonatal development of the nervous system. **Dr. Robert Ho**, Department of Organismal Biology and Anatomy, plans to investigate the role of a functional variant of the oncogene MET that was found to be associated within families in which two or more siblings have been diagnosed with autism. Dr. Ho hypothesizes that MET plays a role in the correct migratory behavior of neuronal precursor cells. By understanding the immediate cellular functions of the MET pathway and correlating these functions to large-scale changes in brain architecture, Dr. Ho hopes to determine if changes in MET pathway can lead to changes in the development of specific brain structures which might contribute to the autistic phenotype. The goal is to contribute to an understanding of how autism can be better diagnosed and prevented.

Devic's disease is a devastating disease of the brain and the spinal cord that causes recurrent bouts of intense inflammation of the visual pathways and spinal cord, resulting in blindness and paralysis. Devic's disease is often thought of as a variant form of multiple sclerosis (MS), and is often treated with the same drugs used for treating MS. However, patients generally do not respond to such treatment. There is some data suggesting that Devic's disease is more similar to diseases such as lupus and a lupus-like condition called Sjögren's disease. **Dr. Adil Javed**, Department of Neurology, plans to characterize the relationship between Devic's disease and Sjögren's disease, using histological and molecular methods. If this study demonstrates a relationship between these diseases, then Devic's disease may be viewed as a form of Sjögren's disease, not a form of MS. Correct diagnosis of this condition will lead to early and appropriate drug treatment. More importantly, this would translate into better recovery for the patients and less healthcare costs.

2007 Seed Grant Recipients

Stephanie Dulawa, Ph.D.
Department of Psychiatry
Identifying novel genes for aggressive behavior

Robert K. Ho, Ph.D.
Department of Organismal Biology and Anatomy
The autism susceptibility gene, MET, and its role during neural development

Naoum Issa, M.D., Ph.D.
Department of Neurobiology
The effect of scene-statistics on cortical maps

Kristen Jacobson, Ph.D.
Department of Psychiatry
A pilot study of genetic and environmental influences on amygdala, orbital medial prefrontal cortex and dorsal anterior cingulate cortex activation: a twin study of fMRI

Adil Javed, M.D., Ph.D.
Department of Neurology
Immunological and molecular mechanisms involved in the pathogenesis of Devic's disease

Daniel Llano, M.D., Ph.D.
Department of Neurology
Investigation of attentional modulation via fronto-thalamic networks

Jason MacLean, Ph.D.
Department of Neurobiology
The role of ongoing cortical activity in sensory information processing: a comparative evaluation across modalities

Kathleen Millen, Ph.D.
Department of Human Genetics
A cause of epilepsy and cerebellar ataxia

M. Kelly Nicholas, M.D., Ph.D.
Department of Neurology and Medicine
A novel fusion protein, FABP7R4, in an experimental brain tumor model

Clifton Ragsdale, Ph.D.
Department of Neurobiology
Molecular mechanisms of neocortical cell type specification

Callum Ross, Ph.D.
Department of Organismal Biology and Anatomy
Kinematics, electromyography, and cortical activity during reaching, grasping and feeding in macaque primates

Ilya Ruvinsky, Ph.D.
Department of Ecology and Evolution
Experimental and computational studies of pan-neuronal gene regulation

Sangram Sisodia, Ph.D.
Department of Neurobiology
Enrichment-induced neurogenesis in adult mouse hippocampus: modulation by FAD-linked PS1 variants

Kamal Sharma, Ph.D.
Department of Neurobiology
Neural control of respiration

Gopal Thinakaran, Ph.D.
Department of Neurobiology
Role of presenilin in dendritic spine formation

Xiaoxi Zhuang, Ph.D.
Department of Neurobiology
Phasic dopamine in reward-based learning and addiction

Women's Council Seed Grant

Elena Rozhkova, Ph.D.
Department of Neurology
Advanced bio-inorganic materials for targeted thermal & photodynamic glioblastoma multiforme therapy

Dr. Gopal Thinakaran, Department of Neurobiology

Alzheimer's disease, the major cause of dementia in the elderly, affects over 5 million Americans. It is estimated that this devastating disorder strikes someone in America every *72 seconds*. Unless an effective treatment or a cure is discovered, it is estimated that 7.7 million Americans will have the disease by 2030, and the numbers could climb to as high as 16 million by 2050. There is a pressing need to develop new therapies for Alzheimer's disease. **Dr. Gopal Thinakaran**, Department of Neurobiology, will focus on a protein that is mutated in early-onset Alzheimer's disease, Presenilin 1. Dr. Thinakaran's research proposal involves the characterization of mice where human Alzheimer's disease causing mutation has been introduced into mouse Presenilin 1 protein. His hypothesis is that Alzheimer's disease causing mutations in Presenilin 1 lead to cognitive problems by affecting the basic synaptic machinery, especially the remodeling of synaptic connectivity in the neuronal network, which is critical for the dynamic process of learning and memory. Dr. Thinakaran's studies will provide important information to advance treatment for Alzheimer's disease.

2006 BRF Seed Grant Program Facts:

- Since the Program's inception, BRF has distributed over $6.9M to neuroscientists.
- To date, every $1 BRF has invested in these new ideas has attracted $21 in future funding. (Many proposals are still pending.)
- 87% of awardees have applied for additional external funding, utilizing data generated from a BRF Seed Grant.
- 40% have already published articles with data generated from BRF Seed Grant funds.

in memory

Remembering Margaret "Mike" Mullins Frank

By William E. Fay, Jr.

Margaret "Mike" Frank
(Photo by Abdoo Studios, Inc.)

Dear Mike was a long-term devoted friend of many. Marg and I became close to Mike when the Mullins and Frank families got together. As you know, it was quite a gang. Our children grew up with all of them.

Mike inherited a Heisman Trophy "fast track" —with a highly successful, highly motivated husband. She became the anchor for the whole family—always available, always trying, always loving—always as pretty as a picture. And I guess what I admired most about her was her wonderful, sustaining sense of humor. Her lightheartedness always prevailed.

Clint was for a large part of my life my best friend—a friendship born of the fact that we each had a handicapped daughter. That brought us together in an effort to make something significant of the Brain Research Foundation. So Mike and Marg and Clint and I had a few decades together of experiencing successes and failures—with laughter and tears. Mike remained a Trustee and a loyal benefactor till the end.

Margaret Mullins Frank (1922-2007)
Margaret "Mike" Frank, wife of the late Clinton E. Frank, passed away on February 26, 2007. Mrs. Frank touched the lives of so many people. She was an honorary trustee of the Brain Research Foundation and a member of the Women's Council of the Brain Research Foundation. She was 84.

in the spotlight

New BRF Trustee: Suzanne M. Kopp

Suzanne Kopp

Suzanne Kopp became involved with the Women's Council of the Brain Research Foundation in 2003. In 2005, she was voted in as Vice-President of the Women's Council. In 2006, Suzanne was elected to the Board of the Brain Research Foundation.

Suzanne's desire to become involved with the Brain Research Foundation resulted from the loss of her husband, Michael Shapiro, at the age of 35, from a debilitating and rare neurological condition known as Rosai-Dorfman. Following Michael's death, Suzanne also made the decision to become more actively involved in supporting the neurosciences and to work to secure a role as an advocate for patients.

At the time of Michael's death, Suzanne was Regional Corporate Counsel for a large international company, within one year of his passing, she became committed to making a career change to honor the memory of her husband and to touch the lives of those facing medical crisis. Initially, Suzanne worked as a fund-raiser in the Medical Center Development Office at The University of Chicago, covering the neurosciences. Her passion, however, was to develop a patient navigation program to provide efficient access to The University of Chicago Medical Center. This program launched in January 2005 under The Program for Executive Health at The University of Chicago Medical Center. In February 2006, Suzanne became the Director of the Program for Executive Health.

Suzanne remains dedicated to helping others, both through her professional career and her work with foundations like the Brain Research Foundation.

seeds for discovery

Women's Council Seed Grant Update

For more information on the Brain Research Foundation, please call (312) 759-5150 or visit our website at www.brainresearchfdn.org

Women's Council of the Brain Research Foundation continues its support of the neurosciences. Most recently, they have been awarding an annual Women's Council Seed Grants in the amount of $25,000 to deserving female researchers. These seed grants provide start-up monies for innovative projects that have the potential of obtaining government funding or other outside sources. This year's seed grant recipient is **Dr. Elena Rozhkova** with her project "Advanced Bio-inorganic Materials for Targeted Thermal and Photodynamic Glioblastoma Multiforme Therapy."

Glioblastoma multiforme (GBM) is the most aggressive form of primary brain tumors known collectively as gliomas. These tumors arise from glial cells of the brain during childhood and in adults. These growths do not spread throughout the body like other forms of cancer, but cause symptoms by invading the brain. Patients treated with current optimal therapy, including surgical resection, radiation therapy, and chemotherapy, have a median survival of approximately twelve months.

Dr. Rozhkova's proposal focuses on new strategies for GBM therapy. The goal is to design, synthesize and test the feasibility of nano-sized magnetic materials on the destruction of cancer cells. It is anticipated that with the completion of the proposed research, Dr. Rozhkova will produce evidence that these novel nanoparticles are clinically applicable and may provide much needed treatment for patients suffering with GBM.

If you would like more information or would like to donate to the Women's Council Seed Grant Fund, please call the Brain Research Foundation at (312) 759-5150.

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