



NEURO TIMES

The newsletter of the
Center for the Neurobiology of
Learning and Memory

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Facts about the BRAIN:

- The adult human brain weighs about 3 lbs (1,300-1,400g) vs. a cat brain that weighs 30g.
- It's not true that humans use only 10% of their brains; each part of the brain has a purpose.
- When you sleep, you're virtually paralyzed because your brain creates a hormone to prevent you from acting out your dreams.

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In the Spotlight

With so many talented Fellows at the CNLM it is always a pleasure to tell our readers about one of them. In this issue of *Neuro Times* we are highlighting Dr. Jorge Busciglio. Dr. Busciglio is an associate professor in the Department of Neurobiology and Behavior and came to UC Irvine in 2003. He received his Ph.D. from the School of Chemical Sciences at the National University of Cordoba, Argentina and then obtained postdoctoral training at the Children's Hospital and Harvard Medical School in Boston, where he later became an instructor in neuroscience. His next move was to the University of Connecticut Health Center where he was an assistant professor of neuroscience.

Since arriving in Irvine, he has been critical to the group of faculty and labs that study neurodegenerative diseases. To put it simply, the Busciglio lab is interested in molecular and cellular mechanisms that are relevant to neurological diseases. The primary focus of their research is to understand the molecular bases of neuronal dysfunction and death in Down's syndrome (DS) and Alzheimer's disease (AD). Jorge is the only CNLM Fellow whose research focuses on DS, however, his results have been and continue to be beneficial to all that study neurological diseases.

Jorge explains that there are structural abnormalities in the DS brain that not only cause

learning disabilities, but impair memory. Among these structural abnormalities are changes in the dendritic spines. Dendritic spines are small protrusions along the dendrites of neurons, and are the primary site of excitatory synapses, the gaps between cells that are well-primed to relay electrical impulses. Biological changes in certain brain structures of DS patients include a decreased number and aber-



Jorge Busciglio

rant architecture of these dendritic spines. Such changes are seen in the hippocampus, which is a structure known to be critical for short- and long-term memory.

The lab recently discovered evidence that astrocytes, a type of glial cell that normally helps maintain the well-being of neurons, are actually involved in the detrimental alterations of dendritic spines in DS patients. Research from Jorge's lab has shown abnormal spine development in neurons growing on top of and nurtured by DS astrocytes. Furthermore, they have identified Trombospondin-1 (TSP-1), an astrocyte-secreted protein, as a critical factor that modulates dendritic spine development and a possible culprit in the

harmful changes to DS dendritic spines.

The more that is learned about the molecular mechanisms that are involved in dendritic spine formation the closer we will be to defining potential therapeutic strategies to correct those defects. In addition, defects in dendritic spine structure and function have been widely reported in AD patients and have been linked to neuronal dysfunction and cognitive impairment. If the possibility of repairing the spine structure exists, then it could be important to both disorders of brain development and for age-related diseases such as AD.

Jorge greatly enjoyed having Holly Yeatman, the 2010 CNLM Foreign Graduate Student Award and the Renée Harwick Visiting Scholars Award recipient, work in his lab this year. Holly is from the University of Melbourne, Australia and conducted research in the Busciglio lab for three months. Jorge says Holly was a perfect match for his lab because she has a background in behavioral studies and incorporated that knowledge into their experiments. The lab, simultaneously, taught her many new molecular techniques that she will be able to bring back with her to her 'home' lab. Both Jorge and Holly have really benefitted from this experience and it would not have been possible without our Friends group, who funded the award to bring a foreign student to the CNLM.

To learn more about Jorge's research please visit our website: www.cnlm.uci.edu/faculty.

CNLM Fellow Becomes Editor

“Souvenirs
are
perishable;
fortunately,
memories
are not”

-Susan Spano

Elsevier, an international publisher of more than 2,000 scientific, technical and medical journals, has named CNLM Fellow and McGaugh Chair holder, Dr. John Guzowski editor-in-chief of *Neurobiology of Learning & Memory*. *Neurobiology of Learning & Memory* is a magazine that publishes articles concerned with neural and behavioral plasticity, including learning and memory.

John received his Ph.D. in Molecular Biology and Biochemistry from UC Irvine. After postdoctoral research at UC Irvine and Johns Hopkins University, he established an independent, funded research program at the University of Arizona and subsequently at the University of New Mexico. His research investigates the role of gene expression, induced by synaptic activity associated with learning, in stabilizing neuronal networks subserving the encoding or consolidation of long-term

memories. In 2010 he was appointed the first James L. McGaugh Chair in the Neurobiology of Learning & Memory, in recognition of his pioneering work examining the molecular and cellular network mechanisms of long-term memory. Coincidentally Dr. McGaugh was the founding editor of *Neurobiology of Learning & Memory* (formerly named Behavioral and Neural Biology) and served in that position for over 25 years.

Hard Work Pays Off

Chris Lay, a CNLM docent and doctoral student in the laboratory of CNLM Fellow Dr. Ron Frostig, has been awarded a \$10,000 Public Impact Fellowship established by the Graduate Division Dean, Frances Leslie. This award is intended to support UCI graduate students whose work has the potential to make a critical difference for Californians and others. Chris is being recognized for his work in stroke therapy research that could provide an inexpensive, drug-free and effective way to save lives.

Chris, with other members of the

Frostig lab, discovered that by mechanically stroking a single whisker on sedated rats, the effects of ischemic strokes – which is the most common kind of stroke and is caused by blockage of a blood vessel – were avoided. Chris is now testing the technique in rats that are conscious and wiggling their whiskers themselves.

“People don’t walk around under anesthesia,” he says. “So while this initial finding was great, we want to determine if someone in the back of an ambulance can be treated this way, while they’re awake and experiencing a stroke.”

To test post-stroke rats, Chris sets up play areas with tunnels, toys and treats that they explore with their whiskers. “Animals are very inquisitive; they use their

whiskers spontaneously,” he says. “So far, the technique is holding up: The stroke is reversed within minutes.”

The next big step is to learn whether touching sensitive spots can also reverse hemorrhagic strokes – which is the other major kind of stroke and is caused by the bursting of a blood vessel. It’s impossible for emergency responders to know which type of stroke has occurred, and they don’t want to cause more harm while trying to help. About 750,000 Americans suffer strokes each year, at a cost of \$74 billion and Chris is excited to be able to contribute his work toward the field. To learn more about stroke work in Dr. Frostig’s lab, please visit our website: www.cnlm.edu/faculty.



Chris Lay

CNLM Fellow Receives Award

Distinguished CNLM Fellow, Dr. Elizabeth Loftus, of Social Ecology and Professor of Law and Cognitive Science, received the 2010 Scientific Freedom and Responsibility Award from the American Association for the Advancement of Science at its 177th annual meeting Saturday, February 19, in Washington, D.C. The associa-

tion honored Loftus for “the profound impact that her pioneering research on human memory has had on the administration of justice in the United States and abroad.” Loftus, who has testified at more than 200 civil and criminal trials, has demonstrated that memories can be implanted or manipulated through a variety of means. Her

work has been vindicated by the finding - based on the more than 250 U.S. prisoners freed after subsequent DNA analysis - that the most common reason for wrongful conviction is faulty eyewitness testimony. To learn more about Dr. Loftus’s research please visit our website: www.cnlm.edu/faculty.

Several months ago, Dr. Eric Reiman delivered a public lecture in our Distinguished Lecture Series on Brain, Learning and Memory at the Barclay Theatre. His talk focused on promising research in the field of Alzheimer's Disease and as always, it ended with questions from the audience.

One of the questions was, "What can we do to help?" Dr. Reiman had a great answer and I'd like to expand on it here.

Memory disorders are critical components of a range of conditions such as depression, drug addic-



Craig E. L. Stark

tion, schizophrenia, amnesia, and PTSD, not to mention Alzheimer's Disease. There are researchers at the CNLM and across the world working on understanding memory's basic mechanisms and how they relate to these and other disorders. Outside of getting a Ph.D. and becoming a researcher, what can people do to help?

There are a lot of ways. Here in the CNLM and elsewhere at UCI we have memory studies going on that need research volunteers (including healthy volunteers). Typically, these studies aren't designed to offer the individual participant a clinical assessment. Rather, volunteering in these studies provides us with the data we use to test theories

of memory function and of the basis for disease. Without this data, the field doesn't move forward. You can also help out by learning more about memory and about research and spreading this knowledge around. Did you learn something new at a CNLM event, like the fact that walking into a room and forgetting what you were going to do there doesn't mean you have Alzheimer's? Tell your friends. Bring them to a lecture at the Barclay, to the upcoming Open House, or to another of our events. The more people know about memory and about research and the more people who know about memory and research, the better. After all, knowledge is power. Finally, of course, since our mission is one of research and outreach, you can help by supporting the CNLM by being a Friend, by being a docent, through a legacy gift, and by telling others about who we are and about what we do.

Ways to Give in the Current Financial Climate

As you know, the State of California is in a prolonged budget crisis which has had and will continue to have a major impact on the University of California. This budget downturn has had a profound effect on the CNLM's ability to run our many programs and events, to cover the costs for the basic operations of our facilities and to support our invaluable administrative staff. More than ever, we are turning to you, our friends and community supporters, to help us maintain our excellence in research and outreach.

We realize, of course, that these have been challenging financial times for many people and strategies for giving have had to adapt. UCI's Office of Legacy Planning has provided us with some important information on the new 2010 Tax Law that you may wish to take advantage of to make a donation. This potential advantage is particularly true for seniors who have significant IRA Accounts. Under the new legislation enacted in December 2010, the IRA Rollover has been extended until the end of 2011. Once again individuals who are age 70 ½ and older will be allowed to make tax-free charitable distributions from a traditional or Roth IRA up to \$100,000.00. Even though no charitable income tax deduction is available, distributions to a qualified charity are not included in gross income and count toward satisfying the IRA minimum distribution requirements for a given tax year.

The 2010 Tax Law will have an impact on charitable giving in other ways. Here are a

few that should have immediate and meaningful implications:

- The amount exempt from estate tax has been increased to \$5 million per person and the exemption is "portable," which means the surviving spouse will have up to a \$10 million exemption.
- The Gift Tax and Estate Tax have been "reunited," which means that the exemption amount, that is now \$5 million, applies to gifts during a person's lifetime OR at death.
- The maximum federal tax rate remains at 35%.
- The lower rate of 15% has also been continued on capital gains tax and qualified dividends.
- The AMT which was scheduled to impact millions of middle-income taxpayers is prevented by the new legislation. This will curtail the reduction in disposable income that would have occurred.

Along with the reinstatement of the IRA Rollover, the provisions highlighted above, should have the greatest impact on charitable giving. They will not only allow individuals to preserve more wealth, but create opportunities for a strategic and timely approach to estate and philanthropic planning.

Donations to the CNLM may be made using the form inserted in this newsletter or via internet at <http://www.egiving.uci.edu>

(under "area" we are Neurobiology of Learning and Memory (CNLM)). UCI's Office of Legacy Planning stands ready to assist you with questions about the information above and about the many ways that you can support the CNLM through a legacy gift, as well as create lifelong income for you and your family. If you wish to have the Office of Legacy Planning call you to discuss the options, you may contact them at (949) 824-3984 or you may use the insert to indicate that you would like a call or email from them.

The CNLM appreciates your support.

Consider what your gift can do today:

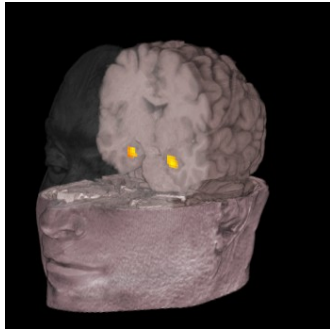
\$500 = One bus trip for students to tour the Center.

\$1,500 = Helps fund graduate student awards for one academic year.

\$5,000 = Provides travel and registration for postdocs and graduate students to be able to attend international conferences

\$7,000 = Provides busing and materials for school tours for an academic year

All gift amounts include staff support for organizing these programs.



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Dates to Remember

A CNLM Open House

SATURDAY,
MAY 14, 2011
1-4 P.M.
CNLM, BLDG 506
QURESHEY RESEARCH
LABORATORY

Short program will begin at 1:30pm

For questions please contact us at: (949)824-5193
or memory@uci.edu

Visit our [Center](#) and meet our team of
[researchers!](#)

- Learn about the CNLM and its cutting-edge research
- Meet with Professors, Researchers, and Students
- View poster presentations - Postdoctoral scholars and graduate students display their research findings
- Ask questions one-on-one to our researchers



A MEMORABLE EVENING: A CNLM SILENT AUCTION DINNER

featuring entertainment by actress *Marilu Henner*

NOVEMBER 4, 2011

UNIVERSITY CLUB on the
UC IRVINE CAMPUS



The CNLM will hold a lively evening of entertainment and silent auction with all proceeds going directly to the CNLM and its programs. Entertainment courtesy of **Marilu Henner**. She is 5-time Golden Globe nominee, Broadway star of *Chicago* and *Grease*, Elaine Nardo on television's "Taxi," and NY Times bestselling author. Her recent appearance on *60 Minutes* introduced the world to her superior autobiographical memory, and her show promises to be a fun trip down memory lane. Ticket information on the event will be provided in our upcoming Fall newsletter. Check our website for updates.

Don't forget the 17th UCI Distinguished Lecture Series held at the Irvine Barclay Theatre is May 11 at 7:30pm