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Synapse

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Symposium Delves into the Science of Positive Emotions

The Center for Behavioral Neuroscience (CBN) annual Spring Symposium, which took place April 16-17, at the Loudermilk Center in downtown Atlanta, brought in speakers from across the globe to share their expertise in field of positive emotion with Atlanta area neuroscientists.

The weekend events began April 16, with an informal poster session. Over 20 researchers presented their work and ideas from the emerging field.

More than 100 people registered to attend Saturday's symposium entitled, "The Neuroscience of the Pro-social Brain." Speakers included experts from Emory University, Georgia State University, McGill University, University of Zurich, and Baylor College of Medicine.

With support from a Templeton planning grant, several CBN members are now developing research proposals to investigate the fundamental neuroscience of positive emotions and social traits such as social bonding, tolerance, trust, altruism, cooperation, empathy, and hope.

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News? Story Ideas?
We want to know!

Call us at 404.413.5464
or email mkoontz@gsu.edu

Editor: Martha Koontz

Finding Could Improve Treatment of Anxiety Disorders *CBN members extend map of fear memory formation*

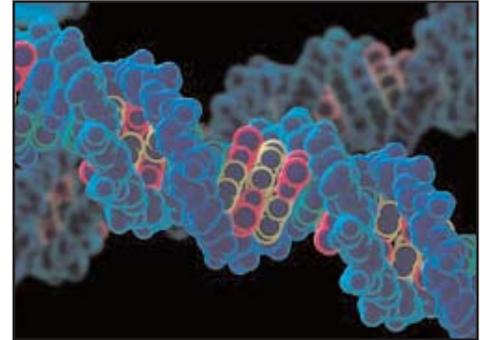
Draw a map of the brain when fear and anxiety are involved, and the amygdala—the brain's almond-shaped center for panic and fight-or-flight responses—looms large.

But the amygdala doesn't do its job alone. Center for Behavioral Neuroscience scientists at Emory University have recently built upon work from others, extending the fear map to part of the brain known as the prelimbic cortex.

Researchers led by Kerry Ressler, M.D., Ph.D., found that mice lacking a critical growth factor in the prelimbic cortex have trouble remembering to fear electric shocks. The discovery could help improve diagnosis and treatment for anxiety disorders such as post-traumatic stress disorder and phobias.

The results are published online in the *Proceedings of the National Academy of Sciences*. Ressler is a researcher at Emory University's Yerkes National Primate Research Center, an associate professor of psychiatry and behavioral sciences at Emory University School of Medicine and a member of the CBN. He is the first practicing psychiatrist to be appointed a Howard Hughes Medical Investigator. The research was conducted in mice at the Yerkes Research Center.

Scientists describe the molecule BDNF (brain-derived neurotrophic factor) as Miracle-Gro for brain cells. It's a protein that pushes brain cells to withstand stress and make new connections. In other parts of the brain such as the



CBN member Dr. Kerry Ressler and colleagues have found mice lacking a critical growth factor in the prelimbic cortex have trouble remembering to fear electric shocks. This discovery could help improve diagnosis and treatment of anxiety disorders.

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Expo Puts Middle Schoolers in Touch with the Brain

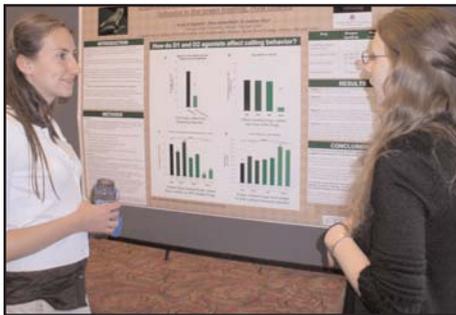
Nearly 200 seventh-graders from Renfroe Middle School in Decatur, Ga, took part in the CBN's annual Brain Expo at Zoo Atlanta, on Friday, April 30. Participants got to touch real brains, visit "Club Neuron," a 40-foot brain cell model, and wear visual distortion goggles to experience how alcohol disrupts normal brain functions.

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Busy Pace to Continue Throughout Summer Months

It has been a busy season at the Center for Behavioral Neuroscience with the expansion of our spring symposium into a two-day event, a site visit from the AAAS, and the beginning of our annual education programs, which will continue throughout the summer months.

We kicked off the season with the annual spring symposium that focused on our emerging research in the field of positive emotions. More than 20 posters were presented during the April 16, poster session, and more than 100 people registered to attend the April 17, symposium entitled, "The Neuroscience of the Pro-social Brain."



A student presents her poster during the CBN's Annual Spring Symposium Poster Session on the evening of Friday, April 16. More than 20 posters focusing on the pro-social brain were presented.

Also in April, a site team visit from the American Association for the Advancement of Science led by Dr. Caryl Chubin, Director of the Center for Advancing Sciences and Engineering Capacity, met with CBN students, faculty, and administrators. The AAAS team is charged with evaluating the success of the NSF's Science and Technology Centers Program, and they will provide analysis later this year.

The annual Brain Expo at Zoo Atlanta wrapped up the month's events on Friday, April 30. Nearly 200 seventh-grade students from Renfroe Middle School in Decatur took a day-long field trip to the zoo to participate in our "reverse

science fair." Post-Expo data suggests students have increased enthusiasm and interest in neuroscience after participating in the Expo.

This success can be credited to the program's director, Dr. Kyle Frantz, Associate Professor of Neuroscience at GSU (who is also our BRAIN Program Director); two student coordinators at GSU, Mr. Evan Werstler and Ms. Rachel Mirpour; a volunteer corps of nearly 100 CBN faculty, staff, and students; and a group of dedicated students from GSU and Central Gwinnett High School who worked all semester to design the Expo teaching stations.

As we move into the summer months, we look forward to the continuation of our education programs. We are pleased to announce our Behavioral Research Advancements in Neuroscience (BRAIN) summer research program for undergraduate students received a record number of applications this year with nearly 300 students nationwide expressing their wishes to take part in the program. From the pool of talented applicants, 40 were chosen as 2010 BRAIN Fellows. This year's BRAIN program will take place May 26 - Aug. 7.

We'll again team with our colleagues at Zoo Atlanta for the Eighth Annual Teacher Professional Development Workshop the week of June 7-11. The workshop, which takes place at the zoo, will host nearly 20 science teachers.

I invite you to learn more about all CBN programs by visiting our website (www.cbn-atl.org), or for quick news bites follow us via Twitter (www.twitter.com/cbnatlanta).



H. Elliott Albers, Ph.D.

By the numbers...

180

Seventh-grade students from Renfroe Middle School in Decatur, Ga, attended the CBN's **Brain Expo** at Zoo Atlanta on Friday, April 30.

288

Record number of applications received from undergraduate students around the country hoping to take part in the CBN **2010 BRAIN** program.

3,513

Number of metro Atlanta K-12 students visited so far during the annual **Brain Awareness Month Classroom Visits** program coordinated by the Atlanta Chapter of the Society for Neuroscience. Thank you to all CBN members who have served as volunteers.

Fear Memory

Continued from page 1

amygdala, interfering with BDNF's effects blocks the acquisition of fear memory.

Some variations in the human gene for BDNF are thought to increase the risk for anxiety disorders and even change the anatomy of the prefrontal cortex in affected individuals.

"The prelimbic cortex is part of the medial prefrontal cortex, which appears to be important for emotional regulation in rodents, as well as humans," Ressler says. "Evidence is building that these regions may be dysregulated or even over-active in fear and anxiety disorders in humans.

Working with Ressler, postdoctoral associate Dennis Choi and colleagues took advantage of a strain of genetically engineered mice that lack the BDNF gene in certain parts of the brain. These include the prelimbic cortex but exclude the amygdala and other regions such as the hippocampus.

If mice are electrically shocked just after they hear a certain tone, they gradually learn to fear that tone, and

they show that fear by freezing. The BDNF-altered mice could run around and respond to shocks just as well, and could still learn to fear tones "in the moment."

However, they seemed to have trouble retaining fear memories as time passed. After learning to fear the tone, the altered mice didn't freeze as much, compared to normal mice, one hour or a day later. Using a different approach, the researchers also found that mice injected with a virus that eliminates the BDNF gene in the prelimbic cortex display similar characteristics.

"This work is important for extending our understanding of how BDNF is important for neuronal plasticity, learning and memory," Ressler says. "Together with our previous work, these data suggest that preventing neural plasticity in very precise, but critical brain regions, can have vastly different effects on emotional memory.

"It is becoming increasingly clear that these prefrontal cortex regions are

functionally associated with regions of the brain known for a long time to be involved in emotion, such as the amygdala and hippocampus," he adds. "Understanding the molecular and cellular mechanisms of these connections in rodent models will provide scientists a better understanding of how these similar areas are functioning in humans."

A related paper in PNAS from Keqiang Ye, Ph.D., associate professor of pathology and laboratory medicine at Emory, and colleagues describes a family of compounds that can mimic BDNF. The research was supported by the National Institutes of Health, the National Science Foundation, the National Alliance for Research on Schizophrenia and Depression and the Burroughs Wellcome Fund.

Writer:

Quinn Eastman, Emory University

Story courtesy of Emory University:

<http://shared.web.emory.edu/whsc/news/releases/2010/01/brain-scientists-extend-map-of-fear-memory-formation.html>

CBN Researchers Prepare for Move Into New GSU Science Center



CBN researchers will soon move into Georgia State University's new Parker H. Petit Science Center.

This summer, CBN members who are faculty in Georgia State University's departments of biology, chemistry, and the Neuroscience Institute will move into the university's new Parker H. Petit Science Center Building.

The massive 350,000-square-foot, \$150 million facility features state-of-the-art laboratories, offices, and classrooms. Located on the corner of Decatur and Piedmont Streets, it will be home to some of the university's research and education programs in biology, chemistry, nursing nutrition, physical and respiratory therapies, the Institute of Public Health, the Neuroscience Institute, and three Georgia Research Alliance Centers of

Research Excellence -- The Center for Biotechnology and Drug Design, the Viral Immunology Center and the Molecular Basis of Disease Initiative.

According to a Georgia State University press release, "the new facility includes vastly improved research and office space on the fifth through ninth floors, including critical core facilities needed for exploration. Officials hope that the science center will attract new researchers to Georgia State, and will open up more space on campus for current researchers."

The Georgia State University Science Center press release is available at www.gsu.edu/40937.html.

BRAIN Seeking Instructors and Mentors for the 2011 Summer Program

Do you need teaching experience?

Consider applying for an Instructor Position with the Behavioral Research Advancements in Neuroscience (BRAIN) 2011 program. We are looking for senior-level graduate students, post-doctoral fellows, research associates, and lecturers who are enthusiastic, knowledgeable, hard working, and who want to spark interest in neuroscience among undergraduate students in a summer research program. Some instructors are needed for short periods of classroom teaching; some are needed for one-to-three weeks, and a few are needed for a full eight-week commitment. Teaching could include day or evening work. Be a part of an exciting summer research program!

- Approximately six positions are available. Time commitments range from one-to-eight weeks in summer 2011. Responsibilities range from lab technique consultant to full-time lab coordinator.
- Familiarity with research techniques, experimental questions, and current literature in one or more of the following areas is required: neuroanatomy and behavior of invertebrate animals, pharmacology, electrophysiology, or molecular biology.

Attention: Neuroscience PIs

BRAIN seeks lab research mentors for summer 2011 program.

- Faculty mentors for approximately 20 summer apprenticeship slots are needed.
- Research apprentices will be selected from a nationwide applicant pool, complete an introductory neuroscience curriculum at Emory University, and be available for at least 35 hours/week of lab research from early June through early August.
- Mentors are requested to submit a brief summary of research opportunities in their labs, attend a “Meet-the-Mentors Luncheon,” and provide an authentic research experience culminating in student presentations of relevant data in a closing Research Symposium.



Dr. Duane Jackson of Morehouse College, mentors two students in his lab.

For more information on becoming a
BRAIN instructor or mentor,
contact Dr. Kyle Frantz, kfrantz@gsu.edu

BAM Classroom Visits Continue into May

The 2010 Brain Awareness Month (BAM) Classroom Visits Program is still going strong even though March has passed.

Due to the large number of classroom visit requests, the program coordinated by the Atlanta Chapter of the Society for Neuroscience (AC-SFN), will continue throughout May.

To date, more than 60 volunteer faculty and students from CBN partner institutions have visited 80 classrooms. The numbers are still coming in, but so far more than 3,000 students have been reached through the program.

The goal of the program is to share the importance of neuroscience with students and teachers in the metro Atlanta community.



Devaleena Pradhan, GSU Neurobiology and Behavior Ph.D. student and BAM Classroom Visit volunteer, teaches seventh-grade students from East Cobb Middle School the differences in various animal brains using comparative brain models available in the CBN Lending Library. Photo courtesy: Tessa Solomon-Lane.

Teacher Workshop to Take Place at Zoo Atlanta

The CBN is pleased to announce the Teacher Professional Development Workshop: Animal Behavior and the Brain will take place June 7-11, at Zoo Atlanta under the leadership of Dr. Laura Carruth, Associate Professor of Neuroscience, Georgia State University. Eighteen teachers from Georgia and Texas have registered for the workshop.

2010 Brains Rule! Brain Expo

“The expo is wonderful because I don’t have the resources to put on an activity like that.”

Susan Brooks, seventh-grade science teacher at Renfroe Middle School, Decatur, Ga. Read more at <http://www.gsu.edu/41487.html>.



Students play the game of LIFE as they learn how to become a professional neuroscientist at the “LIFE: Your Path to Neuroscience” station.



Shouts of “Use It or Lose It” echo from the station that explores how environmental enrichment improves behavior and enhances brain complexity.



Visual distortion goggles simulate the sensory-motor deficits associated with alcohol intoxication, and consider the dangers of drunk driving.



It takes more than 100 student and faculty volunteers to make the Expo a success. Thank you volunteers!



“Touch-A-Brain” station uses a real human brain to provide first-hand information about brain structure and function.



Inside “Club Neuron” the 40-foot giant neuron, students learn about anatomy, action potentials, and neurotransmission.



Celebrating CBN Member Achievement

Keck Travel Award Recipients

CBN Scholars and GSU Brains & Behavior Fellows Laura Been and Amy Ross received this year's CBN travel awards to attend the Keck Center for Behavioral Biology research symposium at North Carolina State University.

Laura, a Georgia State University student, works in the lab of Dr. Aras Petrulis.

Amy, a Georgia State University student, works in the lab of Dr. Marise Parent. Amys talk on the effects of a high fructose diet on memory was named "Best Oral Presentation" at the symposium.

the **w.m. keck** center for behavioral biology

If you or your student has recently been recognized for outstanding academic achievement, we would like to post an announcement in the *Synapse*. To submit an announcement, please send: name, collegiate affiliation, and a brief award/honor description to Martha Koontz at: mkoontz@gsu.edu.

Two Students Attend CISAB Conference

Two CBN undergraduates recently represented the CBN at the 17th Annual Center for the Integrative Study of Animal Behavior (CISAB) Animal Behavior Conference at Indiana University.

The students who represented the CBN are: Adria Lee of GSU whose mentor is Kyle Frantz, Ph.D., also of Georgia State; and Nesha Jairam of Spelman University whose mentor is Gretchen Neigh, Ph.D., of Emory University.



CBN Online...



Follow the latest news bites from the Center for Behavioral Neuroscience on our new Twitter page:
www.twitter.com/cbnatlanta

Be sure to visit the CBN's website for more detailed news and events:
www.cbn-atl.org

CBN Congratulates the 2010 Brain Bee Winners



Congratulations to the 2010 Georgia Regional Brain Bee winners. From left: Ellis Edwards from Alpharetta High School, third place; Olivia Doud from Alpharetta High School, second place; and Eugenia (Jennifer) Botezat from Centennial High School first place.

Story and photo courtesy: Atlanta Chapter of the Society for Neuroscience

Twenty-five students from 16 different high schools around the metro Atlanta area competed in the 2010 Georgia Regional Brain Bee, which took place at Emory University on Saturday, Feb. 6, 2010. Sponsored by the Atlanta Chapter of the Society for Neuroscience (AC-SFN), the 2010 Brain Bee attracted some of the top "brains" among metro Atlanta high school students.

The 2010 Georgia Regional Brain Bee winner, Jennifer Botezat, is a senior at Centennial High School and will be going to Emory University in the fall.

Other winners included Olivia Doud, a junior at Alpharetta High School, who placed second; and Ellis Edwards, a junior at Alpharetta High School, who placed third.

Thanks go out to the many volunteers from the Atlanta Chapter of the SFN who helped make this year's Georgia Regional Brain Bee competition a success. Volunteers included: Kai McCormack, Ph.D., Spelman College professor; Lisa Matrigrano, Katy Shepard, and Monica Chau, Emory University graduate students; and Elizabeth Jeffress, Melissa Chaney, and Marc Badura, Georgia State University graduate students.