The EC Review
Brittany Copp & Dan Manvich, Executive Committee Student Reps

The executive committee recently had the great pleasure of sitting down with the newly appointed director of both the Neuroscience Initiative and the Comprehensive Neuroscience Center, Dr. Dennis Choi. Dr. Choi describes the Neuroscience Initiative as “one of several university-wide initiatives designed to leverage resources, enhance interdisciplinary collaborations, and provide cohesive foci for academic investment. Opportunities for compelling inquiry often arise at the borders of established disciplines. One can see this happening in the neurosciences, as we begin to learn enough about the human mind – its abilities, limitations, and propensities -- to gain useful insights into other areas of intellectual endeavor, including the social sciences and humanities.” The committee was able to offer input that ultimately resulted in the following mission statement for the initiative:

Through inquiry and broad integration of disciplines, the Emory Neurosciences Initiative seeks to contribute to an understanding of the mind: its emergence from the brain, its nature, and its social interfaces. The Initiative also seeks to apply this understanding to the benefit of society, including the promotion of nervous system health, and the teaching of others so that they will carry on this mission.

The Comprehensive Neuroscience Center is designed to address the health-related parts of the Initiative. “The CNC seeks to promote nervous system health through premier clinical care, translational neuroscience research, and education; it specifically aims to develop new ways of integrating care delivery – both preventative and reactive -- around patients.”

Dr. Choi brings years of experience to the Emory neuroscience community, including time spent as a neuroscience researcher, head of Neurology and Director of two research Centers at Washington University (the McDonnell Center for Cellular and Molecular Neuroscience and the Center for the Study of Nervous System Injury), and as executive vice president for neurosciences at Merck Research Labs. He did his PhD training at Harvard in the lab of Dr. Gerry Fischbach.

When asked what role he saw the neuroscience program playing in these organizations and how these organizations would affect the NS program, Dr. Choi had this to say:

“The Neuroscience Graduate Program clearly played a key role in the development of Emory’s neuroscience effort – long-time faculty have told me that the Program was very much the “glue” that brought faculty from different departments together around shared interests. I see it continuing to play a key role in the Neurosciences Initiative and CNC moving forward, as the Program is inherently cross-cutting and aligned with goals. I hope that conversely the Neurosciences Initiative and the CNC will contribute to the continued

(Continued on page 7)

Frontiers in Neuroscience

Please be sure to attend the dates when our very special predoctoral fellows and invited guests present at Frontiers in Neuroscience. And remember, its every Friday at noon in the Whitehead Research Building Auditorium.

2/15 Jennifer Wilhelm & Yair Gozal
3/21 Suzanne Haber (Rochester) Host: Brittany Copp
4/11 R. Adron Harris (UT Austin) Host: Charity Duran
2/29 Jesse Schank & Anna Goldshmidt 4/4 Nancy Kanwisher (MIT) Host: Erin Hecht

Emory Calendar

• February 14 - 16 : Neuro-Recruitment weekend 1
• February 28 - March 1 : Neuro-Recruitment weekend 2
• March 10-14 : Spring Break
• May 12 : End of Spring Term
Radiation Didn’t Give Me Superpowers: Tips for Safety in the Lab
Kevin Murnane, Nikki T. Sawyer and Chris Glielmi

Positron Emission Tomography, Kevin Murnane

Positron Emission Tomography (PET) is a technique that allows a researcher to localize radioactive emissions in space. A PET scan requires a radioactive tracer. This tracer is a ligand that binds to a protein and is attached to a heavy atomic isotope. This tracer travels though the body and attaches to its target protein. As the heavy atomic isotope undergoes radioactive decay it emits a positron (the antimatter equivalent of an electron – yes, there is such a thing as antimatter). When this positron comes in contact with an electron they will annihilate each other. The annihilation event produces gamma rays that travel away from the source. The PET scanner measures these gamma rays through a ring of scintillation crystals. By measuring the speed and geometry of the gamma rays’ movement, the PET scanner can triangulate the source. The scanner picks up millions of annihilation events during a scan and uses the combined information to create a spatial map of these radioactive decays.

The seemingly simple idea of localizing radioactive emissions in space has a surprisingly large number of biological applications. PET can be used to indirectly measure neuronal activity by measuring its correlate cerebral blood flow. This is done by localizing the source of emissions from water containing a heavy isotope of oxygen that is flowing with the blood. Alternatively, radioactively labeled glucose can be used to measure the metabolic state of the neurons (this same technique is commonly used by Oncologists to locate metabolically active tumors). By injecting a radioactively labeled drug, such as cocaine, you can measure its kinetics and distribution. By competing a radioactively labeled (hot) ligand with a non-radioactively labeled (cold) drug you can calculate the proportion of its target receptors or transporters the cold drug occupies. PET is a useful technique with widespread applications in pharmacology and neuroscience, however, it does have some significant safety concerns primarily due to the use of radioactive material.

Table 1

<table>
<thead>
<tr>
<th>Health Risk</th>
<th>Days of Life Lost</th>
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<tbody>
<tr>
<td>Smoking 20 cigarettes/week</td>
<td>2190</td>
</tr>
<tr>
<td>Overweight by 15%</td>
<td>750</td>
</tr>
<tr>
<td>Alcohol intoxication</td>
<td>365</td>
</tr>
<tr>
<td>All accidents</td>
<td>207</td>
</tr>
<tr>
<td>All natural hazards</td>
<td>7</td>
</tr>
<tr>
<td>Occupational dose (300 mrem)</td>
<td>15</td>
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</tbody>
</table>

1. Exposure to radioactive material – One of the core responsibilities of the Emory University Environmental Health and Safety Office is radiation safety (http://www.ehso.emory.edu/). Each person that works with radiation, using PET or any other technique, must first complete a safety course. Furthermore, all people working with radioactive material must wear monitoring badges. These badges are tested every three months to ensure that exposure for any researcher is within the acceptable safety limits. Individuals working with very high levels of radiation or particularly dangerous forms of radiation will also be routinely monitored by bioassay.

2. Long half-lives – The half-life of radioactive material is the amount of time it takes for half of the substance to decay. This varies by isotope. For example, the half-life of C11 is on the order of 20 minutes whereas F18 is on the order of 110 minutes. It is required that 10 half-lives go by before the radiation is considered eliminated. For F18, this takes about 20 hours. Therefore, anything that has come in contact with the radioactive material (including the subject) is considered a safety hazard for potentially long periods of time.

3. Radioactive spread – Since radiation can last hours and contaminates anything that comes in contact with it, it is important to ensure the maximum spread of the material. Therefore, anything that comes in contact with the radiation must be carefully and properly disposed of. Reasonable efforts must be made to limit the subject’s contact with others during the 10 half-life window. In the case of laboratory animals, the subject is returned to its colony but the colony must be labeled to warn people of the hazard from the animals, as well as, any bodily fluids.

4. Long terms effect of radioactive exposure – Chronic exposure to low levels of radiation has the potential to be dangerous. Therefore, there are yearly limits imposed on radioactive exposure. In order to put the danger in perspective, the EHSO office has made Table 1.

5. Spiders – The bite from a spider exposed to high levels of radiation can have unpredictable consequences.

In summary, Positron Emission Tomography is a useful technique with widespread applications in pharmacology and neuroscience. Due to the use of radioactive material, there are some significant safety concerns. However, Emory University has actively addressed the safety of personnel utilizing this technology.

Of Mice and Men...,
Nikki T. Sawyer

Men have always had a hate-hate relationship with mice (think mouse traps, rat poison, and even the Black Plague). But as scientists, we love rodents because of their usefulness in answering scientific questions. Rodents are an ideal mammalian model system: they are small, easily cared for in the laboratory setting, have a short generation time, and can be genetically manipulated. As mammals, they share high homology with humans; in fact, almost every mouse gene has a human homolog. For these reasons, rodents are used quite extensively in neuroscience research. From studying embryonic development to drug addiction... from learning more about intelligence to epilepsy... from creating model systems for sleep disorders to Alzheimer’s Disease... rodents have made innumerable contributions to our knowledge of neuroscience.

As with the use of all living organisms, there are important safety concerns to consider when working with mice. The following are a few to consider:

1. Rodent-Transmitted Diseases -
Food for Thought: Royal Jelly for the People!
Alex Poplawsky, Editor

Ingestion of royal jelly by honey bee larvae causes them to differentiate into discrete behavioral castes as adults. Could this regal substance have the same effect on neural stem cells to cause them to metamorphose into neurons and glia? Of course I would be spoiling the story if I just told you yes.

The story of royal jelly begins with its discovery, which most likely corresponds with the history of honey. The harvesting of honey begins throughout the entire world during the early Paleolithic to Neolithic periods when it is first described in ancient cave paintings. These nomadic hunters are thought to have painted their successful looting of bee hives prior to the hunt in hopes that life will mimic their art. As time passes, humans begin to settle down and become rooted in agriculture. Apiculture, or the keeping of bees, is also believed to take place during this time and was initially practiced by simply integrating a wild hive into the home. However, it wasn’t until the great masters of beekeeping like the ancient Egyptians, Greeks and Romans when great technological strides were made to mass produce honey, bees wax, and, you guessed it, royal jelly. In these cultures, the medicinal value of honey was highly regarded and is mostly noted as a strong disinfectant. The Great Alexander was even believed to be mumified in the stuff (myth), while jars of still edible honey have been found in Egyptian tombs (fact). As for royal jelly, it was regarded as a skin ointment in Egypt or an ancient Viagra in China. Unfortunately, the bee business soon went the way of the Dodo as sugar cane became cheaper to produce in the New World. The scientific enlightenment of the 18th century and the isolation of antibiotics in the 20th century was almost the final blow to honey in which the "mysterious" healing properties of honey were replaced by reason. Only recently has there been resurgence in the study of royal jelly in the scientific community that may once again bring the bee back to the people.

Royal jelly is secreted by the hypopharyngeal glands that are located in the head of young female worker bees. Contrary to popular belief, royal jelly is not reserved for the queen but is fed to the entire bee brood during the first three days of life. However, once those three days expire, the future female workers and male drones receive only honey and pollen while the to-bee queen is stocked with royal jelly. As far as science currently understands, this is the only difference that separates the creation of a queen from her subjects. I think this is where the Neuroscience comes in! Components of royal jelly have recently been identified and are being associated with insect social organization and chemicals mimicking neurotrophic factors in vitro and in vivo.

The eusocial behavior of the honey bee has long been in the eye of science and, with the 2006 completion of the honey bee genome project, a genetic link is beginning to be made. One recent study has examined the genes that encode a novel protein subfamily that makes up ~90% of royal jelly protein. These major royal jelly proteins (MRJP) are believed to have evolved from the more ancient yellow protein family, which was made famous by its multifunctional role in Drosophila. Although, the precise biochemical pathway for MRJPs is unknown in the honey bee, it is interesting to think that they may share commonality with the yellow proteins and their role in the fruit fly. In this species, yellow proteins are thought to influence neighboring cells through a dopamine-like receptor and are necessary to initiate male sexual behavior. In a similar way, the MRJPs can be a genetic messenger to designate the social behaviors specific to the queen through oral administration. But how can this knowledge benefit human health?

To move closer to human application, one research group has looked at how royal jelly affects rat embryonic neural stem cell cultures. They found that application of royal jelly to the cell medium promotes the generation of all types of brain cells, including neurons, astrocytes, and oligodendrocytes. They further hypothesized that a single fatty acid (HDEA) that is unique to royal jelly may be to blame. However, when HDEA was applied to the stem cells, there was only a selective increase in neurons. In this way, it is thought that there are still unknown neurotrophic chemicals in royal jelly that are responsible for differentiation of the glial cell lines. Maybe a look into the major royal jelly proteins is next.

The biggest point to note from the previous study is that even adult rat and human brains have neural stem cells that are primed to differentiate. If they are stimulated by exogenous factors like royal jelly, they may be able to replace dead cells associated with certain neurodegenerative diseases. Unfortunately, these royal agents would have to survive digestion and be able to pass through the almost impregnable blood brain barrier to have any effect. (Continued on page 4)
Royal Jelly for the People! (cont’d)

For this reason, a Japanese research group orally administered royal jelly to examine it as a potential for human therapeutics. They discovered an increase in the mRNA expression of glial cell line-derived neurotrophic factor, which can protect against neuron cell death in neurodegenerative disorders. Specifically, this neurotrophin is shown to facilitate midbrain dopaminergic neuron survival and, in this way, may be protective against Parkinson’s disease. Secondly, an increase in neurofilament H mRNA was found in the rat hippocampus, which is a protein exclusively expressed in neural axons. Even though the physiological significance of this result has yet to be determined, it could mean that new neuron development is increasing in this brain structure. Also, the hippocampus is one brain structure known to progressively degenerate in Alzheimer’s disease, which could be counteracted by oral administration of royal jelly.

The sweet power of honey has had a profound effect on man since life in caves, but has only made a recent reappearance in the scientific community through its regal equivalent. The physiological actions of royal jelly on eusocial behaviors are slowly being tapped and may shed light on how our individual genetics may dictate our society as a whole. Components of royal jelly are even being isolated and ascribed to neuro-plastic roles in the mammalian brain. Reevaluating the wisdom of the ancients under the modern microscope has uncovered some reason behind the mysticism of royal jelly.
Know Your Student-Body Elections
Contributed in part by all elected members

The time for elections is approaching and it is not too late for you to decide where you fit in. Give back to the Neuroscience community and make it a better place to study, work and play. We need you!

GIN Co-Presidents:
Term: 2 years (1 election slot/year)
Time commitment: ~3-5 hours/week
Duties: Organize mixers and parties, attend GSC meetings, defend budget with treasurer, plan Spring speaker with NBB, coordinate seminar series for advanced students and coordinate mentorship program with Nu Rho Psi (undergrad NBB honors organization).

GIN Secretary:
Description: This position is not extremely time intensive and is a good way to get involved with GIN.
Term: 1 year (1 election slot)
Time Commitment: ~5 hours/semester.
Duties: The main responsibilities of the GIN Secretary include maintaining an updated student directory, taking minutes at all GIN meetings, and assigning neurobuddies for the incoming first-year class. Neurobuddies will correspond throughout the summer with their students to assist with choosing a first rotation, preparing to move to Atlanta, and other such issues.

GIN Treasurer:
Description: Manage the budget of GIN and file receipts for the co-presidents. You must attend one school-wide treasurer meeting per year. You also help plan and defend the GIN budget at the yearly GDBBS budget meeting.
Term: 1-4 years (1 election slot)
Time Commitment: ~10 hours/semester
Duties: If you are organized and LOVE money this may be the job for you! There is minimal time commitment.

Webmaster:
Description: The Emory Neuroscience Graduate Program Webpage serves as the primary resource for information concerning everything associated with our program. The regular maintenance of our webpage is not only critical for keeping our faculty and students up-to-date with the program, but also for giving the outside world a representative account of what our program is all about.
Term: 2 years (3 slots)
Time Commitment: < 1 hour a week for general upkeep. Two major updates a year: 1) at the beginning of the fall semester and 2) at the end of the spring semester. Each of these updates necessitate ~ 10 hrs to address.
Duties: The webmaster is the primary administrator to the site, making daily changes as are necessary. The other members of the committee participate in bi-annual reviews of the site to ensure the most current information is posted. For more information contact our current webmaster, Vasiliki Michopoulos.

Frontiers Student Coordinator:
Description: The Frontiers in Neuroscience seminar series is a platform which allows new Emory faculty and those actively looking for graduate students to present their latest data and receive feedback from the Emory community. Outside speakers also come and give talks on special occasions.
Term: 1 year (2 election slots)
Time Commitment: ~30 hours/semester to organize line-up + extra 45 minutes each Friday to help set-up/clean-up.
Duties: Relay student input about Frontiers lineup and work with faculty to organize schedule. Act as student liaison for speaker and assist with technical set-up on day of Frontiers. Order and set-up refreshments each week. It’s a great way to meet faculty, as well as outside speakers, and it is an important skill to learn how to host a speaker.

Admission Committee Student Rep.:
Description: The student recruitment chairs help organize and run the two recruitment weekends each year. They also act as student representatives at the admissions committee meeting to provide student-based input on candidate selection.
Term: 2 years (1 election slot)
Time Commitment: Significant time required Jan-Mar, particularly the time directly around recruitment weekends...
Radiation Didn’t Give Me Superpowers (cont’d)

(Continued from page 2)

Modern laboratory mice and rats are bred to exclude all zoonotic agents, so the chances of catching a disease from lab rodents are rare. Furthermore, incoming rodents from new sources are kept in quarantine before being used. The only risk of catching a rodent-transmitted disease occurs if you handle wild populations, or if your lab rodents are exposed to wild populations. Wild mice and rats can carry diseases such as hantavirus.

2. Rodent Bites - There is a risk of acquiring a secondary infection through rodent bites and scratches. Only handle rodents while wearing the correct personal protection equipment (PPE). If you are bitten or scratched, thoroughly wash the wound with soap and water for 15 minutes and inform your supervisor.

3. Allergies - People who work extensively around rodents are at risk for developing rodent allergies. For mild cases, over-the-counter allergy medicines can lessen the symptoms. If allergies are a continued problem for you, limit your exposure to the rodents’ bedding, as the allergens are primarily located in the urine and feces. If you have continued and persistent asthmatic symptoms, be sure to inform your health care worker that you work with rodents.

4. Surgery Concerns - When operating on rodents, it is essential to follow guidelines and procedures for aseptic surgical techniques to prevent the rodents from acquiring microbial infections. Having healthy, disease-free rodents is important in generating quality research data.

5. Identification - Finally, make sure that you never, ever mistake your laboratory rodent for the device that you use with your computer. Attempting to plug the tail of Mus musculus into your USB port will certainly lead to a bite (see #2).

As long you are careful and follow the established rules and regulations for the handling of rodents, you can expect to have a useful, non-hateful relationship with these little critters who have been much maligned over the centuries.

MRI Safety: How Safe is your Grandmother’s Tattoo in the Scanner?, Chris Glielmi

Magnetic Resonance Imaging (MRI) has emerged as a leading imaging tool for research and clinical applications for the past 20 years. MRI is commonly used for neuroscience applications because it enables noninvasive visualization of structure and function with superior spatial resolution relative to other imaging modalities. Neurologically, MRI is typically used to study anatomical structure, functional correlates of neural activity (fMRI), functional connectivity networks and metabolite levels in brain tissue using Magnetic Resonance Spectroscopy (MRS).

While MRI is increasingly used for medical diagnosis and research, safety precautions are extremely important. The magnetic field of Emory’s 3 Tesla MRI scanner, commonly used for human research, is 60,000 times the strength of the Earth’s magnetic field. This power makes seemingly innocuous metallic objects act like projectile weapons. For patients with risk factors, clinicians determine if the benefit of scanning outweighs risk but research studies should omit potential participants with any risk at all. Here are some of the safety issues that we consider prior to scanning:

1. Metallic surgical implants and pacemakers - While surgical implants in the past 15 years are typically MRI-compatible, older implants could be very dangerous in the scanner. Radiofrequency fields used in MRI scanning can also be detrimental to pacemakers.

2. Accidental and forgotten metallic components - It is critical to probe the participant about potential bullets, pellets, or shrapnel that could be forgotten or unknown. Furthermore, subjects often forget hair clips or pins, so repeated checks are important.

3. Dental braces and body piercings - In addition to traditional braces, wiring behind teeth is often hidden from view but potentially dangerous. Also, all piercings and jewelry should be removed because metallic qualities of jewelry are sometimes unknown.

4. Pregnancy - While there is no conclusive evidence about adverse effects of MRI on fetuses, there also has not been proof that it’s safe. For this reason, you should never conduct MRI research on a subject who might be pregnant.

5. Empty your pockets - It is critical that you do not have any loose change, keys or wallets when you enter the scanner room. Metal objects could be pulled into the scanner and your credit cards could be wiped out.

6. “But I’ve been scanned before…” - Safety screens might ask about prior scans but this does not preclude risk from future scans. A variety of variables including magnetic field strength, imaging acquisition technique, scanner hardware and region being scanned could pose risk even if no adverse effects resulted from past scans.

7. Are your Grandmother’s tattoos safe? - While adverse interaction of tattoos and MRI are extremely rare, old tattoo ink (before regulation) can contain metallic fragments. The Discovery Channel’s MythBusters “busted” the notion that a tattoo could “explode” but acknowledged potential burning or discomfort. Other studies have shown rare cases where skin irritation resulted only from old, homemade tattoos with cheap ink. Although these cases are very rare, it is worth consideration with tattoos from more than 25 years ago.

When safely used, MRI enables noninvasive insight to the brain’s function and structure. To continue safe applications of MR research, it is critical to strictly screen subjects to avoid even minor risks. The general rule is to weigh the benefit vs. the risk for clinical cases but to take absolutely no safety risks for research initiatives. ▲
The EC Review (cont’d)

(Continued from page 1)

The EC would also like to introduce the most recent additions as full training faculty to the NS program, Lih-Shen Chin (Pharmacology), Thaddeus Pace (Psychiatry), Gretchen Neigh (Psychiatry), Nicholas Boulis (Neurosurgery), Subhabrata Sanyal (Cell Biology), Joseph Manns (Psychology), and Ranjita Betarbet (Neurology). They each bring active research programs and expertise to the neuroscience program. Be sure to check them out on the neuroscience website http://www.emory.edu/NEUROSCIENCE.

A huge round of applause goes out to the entire Admissions Committee (Shawn Hochman-Chair, Beth Buffalo, Ping Chen, Tim Duong, Art English, Andrew Escayg, Don Rainnie, Pete Wenner, and student reps Mike Kelly and Becky Seaman) for reviewing all of this year’s applications and making the difficult decisions regarding who to invite for interviews. This year over 40 of the best and brightest students are going to visit the Emory neuroscience program over the course of two recruitment weekends, February 14th-16th and February 28th-March 1st. If you would like to know how you can help please contact Mike Kelly (ceallaig33@gmail.com) or Becky Sea-

Know Your Student-Body Elections (cont’d)

(Continued from page 5)

important information relevant to the Neuroscience Program. Current EC Student Representatives: Dan Manvich (term ending) and Brittany Copp (term continuing).

Curriculum Committee Member:
Description: Serve as a student representative on the curriculum committee. Provide input on the development of new courses and changes in the required curriculum for students in the Neuroscience Program
Term: 2 years (2 election slots)
Time Commitment: ~7 hours/semester
Duties: Attend meetings of the Curriculum Committee (~3-4/year). Review syllabi of new courses. Provide a voice for student input into the design of the Neuroscience Program curriculum.

GSC Rep.:
Description: The GSC is composed of graduate students in all programs at Emory. Its aim is to improve the quality of a life as a graduate student by communicating with higher authorities including the Dean.
Term: 1-2 years (1-3 election slots)
Time Commitment: 1-2 hours per month
Duties: Attend monthly meetings to discuss ongoing and new concerns of the council. Vote on matters that need action and attention.

DSAC Rep.:
Description: Act as neuroscience representative on division-wide advisory panel.
Term: 1 year (1 election slot)
Time commitment: ~2-5 hours/month including a monthly meeting.
Duties: Disseminate information to neuroscience students about changes in GDBBS and provide input from students on division wide decisions. Help with planning student research symposium for the division and a student mixer in the spring. In this position, you have direct contact with the GDBBS administration including Dean Wilkinson, which allows you to get the full story on changes planned for the division and also represent the student body regarding these changes. For more information, contact Zoe Donaldson.

ACSFN Rep.:
Description: The ACSFN consists of neuroscientists from the Atlanta area that help to promote research and public understanding of the nervous system.
Term: 2 years (2 election slots)

Time Commitment: Depends on the event. However, there are only a few events scheduled throughout the year.
Duties: Help plan annual SFN poster preview and Brain Awareness Week. In addition, you can also organize other events to showcase the research that is currently being conducted by neuroscientists in Atlanta. For more information contact our current ACSFN representatives, Rebecca Rosen and Kim Maguschak.

Central Sulcus Editor:
Description: The Central Sulcus is a student run newsletter aimed to serve our Neuroscience community with updated program information and to discuss general Neuroscience topics of interest.
Term: 2 years (1 election slot/year)
Time Commitment: ~30 hours/sulcus
Duties: Produce two newsletters a year by organizing writers, proof-reading drafts and compiling the final product. Also, if you enjoy creative writing, the Central Sulcus is a great avenue to present your work to a knowledge hungry crowd. For more information, contact our current editors, Alex Poplawsky and Amy Mahan.
The Central Sulcus

The Printables...

NS Faculty Crossword – Last names only… should you need assistance, visit our webpage.

ACROSS
3 Interaction between HPA and HPG axes.
6 He supplements DGS activities with playing with leeches.
9 Norepinephrine everything (including the worm).
10 Non-human primate model of AD with plaques?
12 She can’t get enough of the enteric nervous system.
13 Our very own electron microscope expert, eh?
14 A prior Eli whose the father of fear conditioning.
15 The chair of the pharmacology department.
16 In vivo recording of auditory cortex and ultrasonic vocalizations in mice.
17 Creator of monogamous chapstick.
18 Web MD’s expert on Depression.
19 He manages PET ligand synthesis.

DOWN
1 DJ of our annual retreat trivia madness.
2 Director of YNPRC.
4 She lesions limbic structures to assess memory function
5 The GABA Guru.
7 He’s making transgenic monkeys? What?!
8 Expert of comparative brain evolution.
11 Neurosteroids and THI: Bench to bedside.
14 He runs the Yerkes Imaging Core.

Sudoku

Rules:
1. Insert a number (1-9) into every square
2. Each ROW must contain every number 1-9
3. Each COLUMN must contain every number 1-9
4. Each 3 X 3 group of squares (highlighted with bold lines) must contain every number 1-9

The Adventures of Professor Wernicke

The Ups and Downs by Rikisha

Yahtzee!!
Farewell from the Editor

I am sad to say that this newsletter will be my last and that I will greatly miss it. It was really a great experience from the start and I would encourage anyone to run for my position. However, I wouldn’t be able to leave the Central Sulcus until I said some thanks. First, to all the writers, whether you were a one time contributor or my go-to guys for the running themed articles. Without their hard work, the newsletter would be nothing. Also, to “The Printables” people for adding a little fun to the newsletter. I think it reflects a little bit of the Neuroscience flavor in our program. To Zoe, for starting this growing juggernaut. Without your initiative, I cannot say whether the Sulcus would even exist. Finally, to the new editor-in-chief, I’m outta here. Good luck!▲

---Alex

Call for Brain Awareness Month Volunteers!
Kim Maguschak

March is Brain Awareness Month. Each year, the Atlanta Chapter of the Society for Neuroscience spreads the word about Brain Research to schools and the public. We host visits to Atlanta area elementary, middle, and high schools, reaching thousands of students. If you would like to volunteer for a classroom visit, please fill out the online form at www.atlantabrains.org.

Extracurriculars

March

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<tbody>
<tr>
<td>3/12</td>
<td>Wednesday</td>
<td>Atlanta Hawks vs Houston @ Philips Arena</td>
<td>NBA</td>
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<tr>
<td>3/21</td>
<td>Friday</td>
<td>Chris Rock @ the Fox Theatre</td>
<td>Comedy</td>
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<tr>
<td>3/28</td>
<td>Friday</td>
<td>Atlanta Braves vs Cleveland Indians Exhibition @ Turner Field</td>
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April

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<tr>
<td>4/12-4/21</td>
<td>Barenaked Voices: Fifth Annual Emory</td>
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<td>Student A, Cappella celebration, Eric Nelson, host</td>
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<td>4/12-6/1</td>
<td>Georgia Renaissance Festival in Fairburn, GA</td>
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<tr>
<td>4/30-5/1</td>
<td>Bon Jovi @ Philips Arena (Music)</td>
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May

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<tr>
<th>Date</th>
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<tbody>
<tr>
<td>4/22-5/24</td>
<td>An evening of musical Shakespeare @ Atlanta Symphony Hall (Arts)</td>
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The Emory Neuroscience Graduate Program leads to the Ph.D. degree and is designed to provide a broad background in modern neuroscience, as well as specialized training in a wide range of specific research areas and techniques. The particular areas of strength in our program are further described on our website. The broad range of research interests coupled with a collaborative atmosphere make the Emory Neuroscience Program well suited to provide a strong, dynamic and exciting environment in which to pursue graduate studies.

For more information please check out:

www.emory.edu/NEUROSCIENCE

or

Contact Sonia Hayden at shayden@emory.edu or (404) 727-3707.

For comments on this newsletter please contact Alex Poplawsky at apoplaw@emory.edu.