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NIDDK NATIONAL INSTITUTE OF
DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

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The Conference Issue

THANK YOU ALL FOR MAKING THE 9TH ANNUAL NIDDK FELLOWS' CONFERENCE A GREAT SUCCESS!

ASIDE FROM THE WONDERFUL ARTICLES WE USUALLY HAVE IN THE INFORMER, THIS ISSUE CONTAINS A SERIES OF CONFERENCE ARTICLES AND PHOTOS THAT WE HOPE YOU ALL WILL ENJOY.

REGARDS,

THE NIDDK FELLOWSHIP OFFICE AND THE NIDDK FELLOWS' ADVISORY BOARD



Announcements:



THE INFORMER WOULD LIKE TO WELCOME NEW CO-EDITOR KAVYA DEVARAKONDA

Partial Credit - Letter from the Editor

I want to personally thank this issue's contributing authors and extend my congratulations to the poster and oral presentation winners. Some of the seminars, I found particularly entertaining. My most memorable moment was during the Career Panel, when Dr. Silva, an Assistant Teaching Professor at Carnegie Mellon, described having to adjust to the culture of teaching at a private American university by embracing this concept called "partial credit." You could imagine her mentally cringing every time she had to award points for an answer that was basically wrong.

Her story reminded me of Mr. Ward, my AP European History teacher back in high school. He would give an essay test every week to prepare us for the exam. We soon learned that if we did not like our grade, we could argue with his critiques, and he inevitably would give us more points. On the one hand, this was ridiculous. It was not as if, after taking the AP test, we would be able to argue with those who scored our exam. On the other hand, convincing someone to give us credit for answers that do not completely address the question being asked is one of the most valuable skills someone looking for a job in today's economy could have. Rarely do job descriptions exactly match our experience. Yet we are tasked with convincing a stranger that, despite the discrepancies, we are the most qualified for the job. Looking back, I see that Mr. Ward was concerned with more than how we scored on a national test. He wanted to encourage us to fight for what we all could get, and dangling the prospect of partial credit was the way to do it. So fight on, fellows. Go for that internship. Get a little teaching experience at FAES. Be a regular writer for the iNFORMER (ahem). That little bit of credit will go a long way towards your goals of economic independence.

Finally, for those who attended the conference, I hope you enjoyed yourselves (please turn in your surveys!). For those who did not attend, I hope the following articles gave you a flavor for what you missed. For myself, I had a great time catching up with fellows and NIDDK alumni I rarely see. I did not go to all the events, but I did go to some...and I definitely get at least 10 out of 50 points for making the effort.

CHRISTINE

Nancy Nossal Winners, March 2014



Kimberly LeBlanc
(DEOB)



Chia Li
(DEOB)



Katherine Truex
(LCP)



Emily Webber
(DEOB)

Oral Presentation & Poster Winners

- Kimberly LeBlanc (Poster)
- Jeanne Morin-Leisk (Oral)
- Di Wu (Poster)
- Mohammad Rahman (Oral)
- Jennifer Taylor (poster)
- Travis Hoppe (poster)

Keynote Seminar

Tanya T. Paull, PhD Mechanisms of DNA repair and oxidative stress signaling

By Sabrina Lusvarghi

Dr. Tanya Paull addressed the fellows on Thursday morning with an inspiring lecture. The understated HHMI investigator focused her talk on her discoveries related to DNA damage and repair. One of the questions that motivated her research is how do cells decide whether to survive, arrest or undergo apoptosis upon DNA damage? Dr. Paull emphasized the significance of her work highlighting that the basic double-stranded DNA repair pathways are conserved in all organisms, and how failure in this process leads to disease. Particularly she showed how the MRN complex (Mre11/Rad50/Nbs1) acts as one of the first checkpoint responses initiated by the double stranded breakage (DSB). She mentioned how failure of this complex to respond results in Ataxia telangiectasia (A-T), a neurodegenerative disease that results in severe loss of mobility.

Dr. Paull also embraced her contributions in the understanding of ATM-mediated signaling that occurs as a response to DSB. She proved how thinking outside the box could lead to answering significant scientific questions. In her particular example she told the story how she started wondering about the phenotype associated to A-T: she wanted to know why this disease resulted in neurodegeneration. Her answer came from the evidence showing that cells from patients with A-T had significant sensitivity oxidative stress and high levels of reactive oxygen species (ROS); symptoms that could be reverted by antioxidants



feeding. Dr. Paull showed most of the biochemistry studies that lead to a critical understanding of the ATM pathway. As another lesson in science, she showed how important literature and data association are in order to achieve optimal results in an efficient manner. Particularly she emphasized how it took her lab more than two years to identify mutants that could differentiate the ATM response to H_2O_2 versus MRN activation; and only when association to previous data and literature was done, the site of mutation became obvious. Ultimately she was able to find single mutants that resulted in response exclusively to oxidative stress. Her work eventually showed that ATM undergoes an activation pathway independent of the MRN complex of DNA breaks. She proposed that this pathway is required for apoptosis induced by ROS and suggested that it also appears to regulate antioxidant functions in human cells.

Keynote Seminar

Sally Rockey, PhD Strengthening the Biomedical Workforce

By Joseph P. Tiano

Dr. Sally Rockey, Deputy Director for Extramural Research and Director of the Office of Extramural Research, gave the keynote address on April 24th. Her talk focused predominately on the status of the biomedical workforce as laid out in the results from the Biomedical Research Workforce Working Group in which she also serves as co-chair with Dr. Shirley Tilghman, President of Princeton University. The complete report can be found at <http://acd.od.nih.gov/bwf.htm>. The goal of the working group was to “Develop a model for a sustainable and diverse U.S. biomedical research workforce that can inform decisions about training of the optimal number of people for the appropriate types of positions that will advance science and promote health.” However, they quickly realized that the available data on the biomedical workforce was extremely lacking and that before making recommendations for improvement they needed a better understanding of the current composition of the biomedical workforce.

To understand the complexity of their task consider that an estimated 350,000 people are supported either fully or in part by an NIH grant and that those 350,000 people make up 1,200 “different” position titles. Most of those titles are simply different names for the same job – for example there were 350 different names for a postdoc. Once the data from a variety of sources (NIH, NSF, NPA, AAMC, and FASEB) was sorted through and analyzed the most complete picture to date of the U.S. biomedical workforce was made publically available. Roughly 1 in 5 or 23% of biomedical postdocs end up in a tenured academic position. This is on the higher end of previous estimates that found anywhere from 12 to 30% of biomedical postdocs end up in a tenured



Dr. Sally Rockey
(right) with NIDDK
Fellow Nadine
Samara (left)

academic position. Perhaps not surprisingly less than half (43%) of all biomedical postdocs end up in academia (includes both research and teaching) – strongly supporting the push to stop referring to nonacademic careers as “alternative careers” since the data clearly shows that academic careers are the alternative career. Lastly, the report found that 13% of biomedical postdocs leave scientific research altogether for careers in science writing, teaching, consulting, nonprofits, policy, etc. while 2% are involuntarily unemployed. Importantly, the percentage of biomedical PhDs who consider themselves underemployed (i.e. working in positions they would rather not be working at due to lack of other opportunities) is unknown and remains an avenue for further exploration.

In addition to the composition of the biomedical workforce Dr. Rockey also shared some disheartening statistics for postdocs planning on becoming tenured professors. The average age for receiving a first R01 grant, which is considered essential for obtaining true research independence, has increased from 36 years of age in 1980 to 41 years of age in 2012. Coinciding with this increase is the increase of the average age of all academic researchers with an R01 grant. In 1980 the average age of R01 grant awardees was 37 and in 2012 it was 59. Furthermore, a full 10% of academic professors are over the age of 66.

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The increasing time to receive a first R01 is discouraging because it means that biomedical PhDs spend around 10-13 years in “training” AFTER receiving their PhD, but before becoming an independent researcher (its 15-20 years of “training” if you include the PhD). Furthermore, the increasing average age of R01 researchers means that young researchers have to compete for a decreasing percentage of available grants with an increasing number of successful and experienced researchers.

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The report also found that the NIH's effort over the last 10 years to increase the number of females and minorities in the biomedical workforce has largely failed. For the past decade women have been the majority of biomedical trainees and have received more PhDs than men yet there are fewer women in faculty positions. There is a fallout between when a woman receives a PhD and when she becomes a faculty member. A series of high-profile journals such as *Nature* and *Science* have published articles examining the reasons for this fallout but no drastic measures have yet to be

taken to address the problem. Even more discouraging are the low number of minorities in science and their disproportionately low chances of being awarded an R01 grant. In 2008 less than 500 underrepresented minorities received a PhD in the biomedical sciences, representing roughly 4-8% of the total biomedical PhDs awarded (Figure 1). In addition, black applicants are 10 percentage points less likely to receive an R01 award even after controlling for educational background, country of origin, training, previous awards, publications and research institution (Figure 2).

Figure 1

Demographics for Underrepresented Minorities in the Educational Pipeline

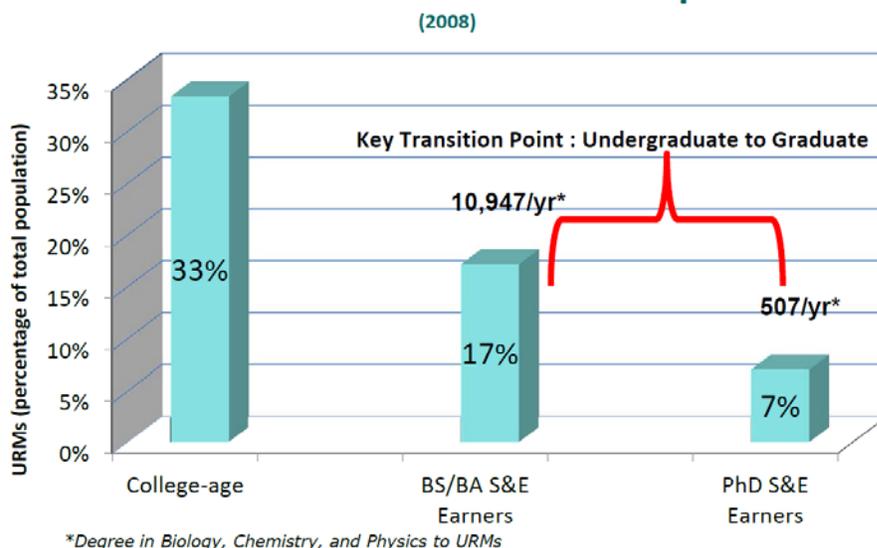


Figure 2

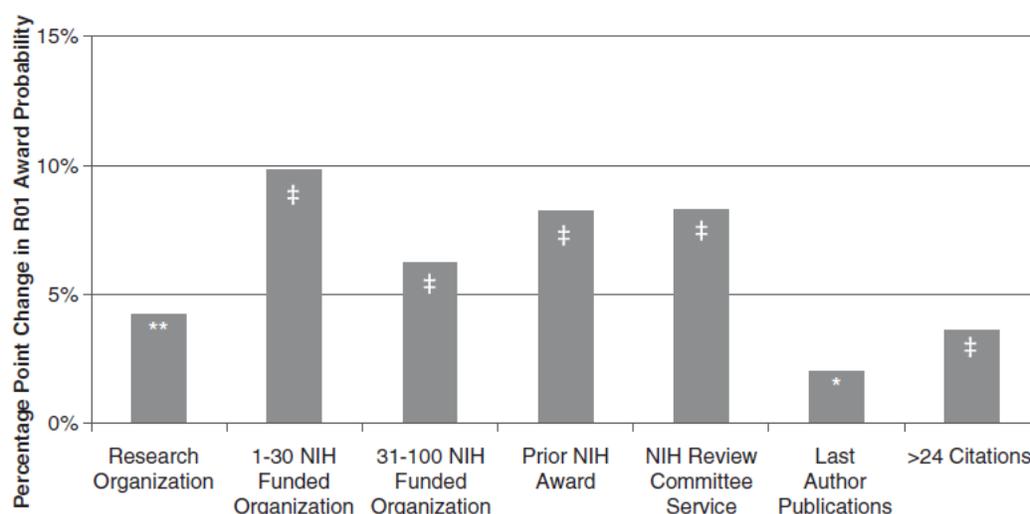


Fig. 4. Effects of affiliation and previous research on R01 award probability. 1 to 30 and 31 to 100 NIH-funded institutions were derived by ranking institutions by NIH funding received FY 2000 to FY 2006. ‡, $P < .001$; **, $P < .01$; *, $P < .05$.

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Dr. Rockey concluded her talk by outlining current steps being taken to reverse these discouraging trends. One of the main recommendations of the working group was to increase the starting salary for biomedical postdocs with 0 years of experience from \$39,000/year to \$42,000/year and tie it to inflation (for example a 4th year postdoc – the average length – would make \$47,820/year). This is an effort to reflect postdocs' extensive training but more importantly to discourage lab heads from prolonging postdoc training. These salary increases are scheduled to go into effect in July 2014. In September 2013 the NIH allocated \$3.7 million from the NIH Common Fund's Strengthening the Biomedical Research Workforce program for an experimental program called Broadening Experience in Scientific Training (BEST). The goal of the BEST awards is to enhance training opportunities for graduate students and

postdoctoral scholars to prepare them for careers in the biomedical research workforce that could take them outside of conventional academic research. The BEST awards will accomplish this goal by giving institutions up to \$250,000/year for up to 5 years to develop training programs that include bold and innovative approaches to increase student and trainee exposure to multiple research and research-related career options. More information can be found here: <http://www.nih.gov/news/health/sep2013/od-23.htm>. The first awards were announced in September 2013 and many organizations are anxiously awaiting the results.

Lastly, Sally Rockey has a blog called "Rock Talk" which she writes once a week on issues facing postdocs and biomedical research. Visit her blog at <http://nexus.od.nih.gov/all/category/blog/>.

Christina Farias

Teaching Opportunities for Postdocs

By Umesh Wankhade

The postdoctoral training program at NIDDK is focused on training fellows in all aspects and preparing them for the next phase of their career. All of us have different aims and directions as far as our next careers steps are concerned. Having a higher education degree and being in academic settings for most of our educational life, it's not surprising that many of us are interested in teaching careers. As part of the career development section at this year's NIDDK Fellows retreat, FAES executive director Ms. Christina Farias gave an overview of teaching/learning opportunities that fellows can avail at NIH through FAES.

FAES is a nonprofit educational and charitable organization started in 1959. It supports learning, teaching, WALs lectures, the Duke-NIH partnership program and housing for students. FAES has a newly built 1500 sq. ft. state-of-the-art classroom, office space and a bookstore at building 10 at NIH. Modern audio visual aids, cameras and teleconference capability enable them to run their distance learning program. Fellows at NIH can benefit from learning and teaching at FAES graduate school. There are several courses offered during the fall and spring semester for which FAES is always looking for instructors to teach. Considering the widely diverse international fellows population present at NIH, FAES is also pondering on offering teaching courses that will include how to use an effective teaching aid, how to deliver the content and how to improve public speaking ability. FAES is planning on partnering with local schools and bringing in professional teachers to teach these courses. They will be 6 week-long courses.



These courses will be different than what OITE offer. The pilot course will be directed towards a specific population; only 15 people will be allowed in each class, which will help provide individual attention to each student. Project management courses, business school courses are also on the table and will be started based on the interests shown by the fellows.

Ms. Farias also mentioned some of the free learning resources such as Coursera, iTunes U where fellows can take many types of courses for free and with the convenience of sitting on a couch. At the end of the presentation, Ms. Farias urged all fellows to fill out the FAES survey which is very important for planning future courses and training programs offered by FAES. All fellows are welcome to contact FAES with their questions and suggestions at <http://www.faes.org/about/contact>.

An Excellent Conversation with Dr. Jon Lorsch

By Simon Messing

After last year's successful discussion with new scientific director of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Dr. Michael Krause, this year's conference continued the event with the new director of the National Institute of General Medical Science (NIGMS), Dr. Jon Lorsch. Dr. Lorsch took the helm at NIGMS in August, after a successful career studying RNA and translation initiation as a tenured faculty at Johns Hopkins School of Medicine. During his time at Johns Hopkins he received numerous teaching awards from the student body, and became heavily involved in curriculum development. This made the transition to NIGMS all the more prescient.

At the outset of the session Dr. Lorsch laid out two primary missions of the Institute: the first is to "promote fundamental research on living systems thereby laying the foundation for advances in disease diagnosis, treatment and prevention," the second is to "enable the development of the best trained, most innovative and productive biomedical workforce possible". He then further delved into the first part of the mission, by pointing out the \$2.36 billion budget for NIGMS. He said that 89% has been allocated for extramural funding, and that with the doubling of the budget in the early 2000s, a significant share is going to targeted research. This is research that fits a research area mandated by the Institute, such as, the structural genomics consortiums (i.e., big science). However, the budget for research is flat, and is slowly being eroded by inflation. Therefore, in order to get back to NIGMS' primary mission Dr. Lorsch is working to deemphasize targeted research, and get back to funding individual investigator initiated research. This should hearten all the postdoctoral fellows as they look to become investigators of their own and write their first grants.



The second mission of NIGMS is funding graduate student programs at the University level. As Dr. Lorsch put it NIGMS is the "gorilla" in room when it comes to funding graduate student programs through its T32 grants. The Institute is responsible for funding 3,832 graduate students via \$193,410,531, which outpaces all other NIH Institutes combined by a 2:1 ratio. Dr Lorsch also brought up two more important points in addition to the facts on funding. One is as he puts a "Malthusian" problem, where principle investigators/faculty are training far more PhDs than is necessary to replace and fill the positions available. The second is that science has drastically changed in the last decade, which he showed by means of a graph and other metrics. However, as he pointed out biomedical training has not changed in the last decade at all to reflect these sea changes in science. To this end he encourages universities to begin experimenting with their training programs to begin to address these issues as well.

Following his initial introduction the session was opened up for questioning, where several people brought up good questions. Many questions centered on how to change the current graduate programs to better prepare new PhDs for jobs outside academia and the principal investigator route. Dr. Lorsch responded that allowing Universities to experiment with their training programs to figure out how best to deal with these issues is precisely what we need. Overall, this year's session was just as successful as last year's, and it proved to be an excellent forum for interaction between the postdocs and individuals responsible for setting policies that guide our careers.

Comedic Relief

Surviving Your Stupid, Stupid Decision to Go to Grad School

By Kavya Devarakonda

One of the most hotly anticipated events of the Ninth Annual NIDDK Fellows Scientific Conference was the talk by Adam Ruben, PhD, “Surviving Your Stupid, Stupid Decision to Go to Grad School.” Billed as a writer, comedian, storyteller, and molecular biologist, Ruben betrayed his science geek roots with the occasional flat joke and a homemade rap video, but overall, the hour was an entertaining addition to the two-day conference.

Ruben began the talk by discussing his time in graduate school, during which he was, in his own words, overworked, underappreciated, and tired. He reminisced about less-than-glamorous graduate student duties: administering undergraduate exams, which he and his friends dubbed “proctor and gamble” due to their habit of placing bets on the number of students who would attempt to cheat; assistant teaching (he once messed with a class of pre-medical students by pretending to not speak English on the first day of class); and grading laboratory reports (one of his students began every conclusion section with “Overall, this lab was a success,” despite receiving a C- in the course).

Ruben also read the audience excerpts from his 2010 book, “Surviving Your Stupid, Stupid Decision to Go to Grad School.” Chapter Six, titled “Six Degrees of Exasperation,” includes a section called “Mnemonic Plague,” which mocks the various memorization techniques touted by medical students. In Chapter Seven (“Let My Pupil Go”), Ruben illustrates the often tedious process of writing and editing a dissertation by allowing a mock thesis committee to mutilate the simple sentence, “A boy goes to the store.” After adding more detail, then removing extraneous details, referencing a narcissistic committee member’s work, then obscuring the reference to please another committee member, and entirely changing the genre of the sentence from prose to limerick, the flummoxed author is informed that his field has shifted during the editing process and that he must start over.



Although there was plenty of appreciative laughter, the audience of mostly postdoctoral fellows did not appear to fully share Ruben’s exasperation with graduate school. Most of the audience, or at least those who were willing to share, graduated in five or six years, weakening Ruben’s jokes about the eternal graduate student. After Ruben’s excerpt about the dissertation process, one brave fellow shared that his path to graduation had been much simpler than Ruben’s portrayal. And at the end of the talk, the sole question to Ruben was whether he thought there was an intrinsic value in a PhD beyond the job prospects it offered, with the implication that the asker thought there was. Ruben conceded that, “any education is better than no education,” but insisted that there were aspects about the graduate school experience that needed to be changed, including the value of stipends and the uncertain completion times.

Amid his humorous anecdotes, Ruben did have some serious advice for those considering graduate school and those who have already escaped: You have a lot more control than you think you do. He said that he spent a lot of time in graduate school complaining about his lack of control over life when, looking back, he could have been more proactive about publishing papers and working toward graduation. Ruben also advised graduate students and postdoctoral fellows to take advantage of the opportunity to do as much as possible outside of the lab — for example, tutoring high school students — and to be thoughtful about choosing mentors.

Oral Presentations - Metabolic Diseases

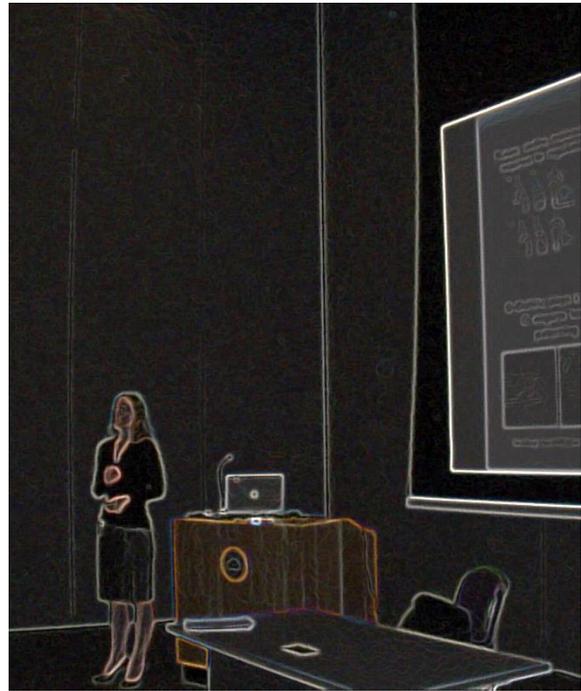
By Nermi Parrow

Metabolic diseases are a major source of morbidity worldwide and a major focus for NIDDK. Oral presentations in this section consisted of several excellent talks. Topics included chronic kidney disease, novel protein expression systems, nonalcoholic fatty liver disease and the origin of beige fat.

Dr. Ana Souza, from the Kidney Diseases Branch, started off the session with a discussion of the potential utility of targeting the widely expressed scavenger receptor, CD36, in the treatment of chronic kidney disease. CD36 is involved in lipid metabolism and metabolic syndrome. Her work indicates that knockout mice lacking CD36 and mice treated with a CD36 antagonist do not develop chronic kidney disease in response to nephrectomy combined with infusion of angiotensin II whereas wild-type mice subject to these treatments do.

Dr. Antonino Baez, a fellow in the Biotechnology Core Laboratory, followed with a completely different topic highlighting the diversity of research sponsored by NIDDK. His work is dedicated to designing a novel protein expression system in *E. coli*. He has used the *soxS* promoter, which is a component of the oxygen-inducible SoxRS regulon, to create a vector that allows for oxygen-inducible recombinant protein expression. Under high-density growth conditions, approximately 500 mg of green fluorescent protein were produced per liter of *E. coli* following a 3-hour induction with 300% air saturation. In contrast to current induction methods, this system does not require the alteration of media components.

From the Laboratory of Biochemistry and Genetics, Dr. Chengfu Xu presented his work on the role of xanthine oxidase in the production of uric acid and induction of hepatic fat accumulation in nonalcoholic fatty liver disease. Data from cellular and animal models indicate that inhibition of xanthine oxidase decreases uric acid production and improves hepatic steatosis. Dr. Xu's studies further suggest that xanthine oxidase appears to be involved in the regulation of the NLRP3 inflammasome and subsequent pro-inflammatory



cytokine production, which are important components of chronic liver disease.

The final presentation was given by Dr. Umesh Wankhade of the Diabetes, Endocrinology and Obesity Branch. His work is focused on the role of TGF- β receptor I on the development of beige fat. Whereas white adipose tissue stores fat and brown adipose tissue utilizes it for heat generation, the role of beige fat is not fully defined. Adipose tissue-specific knockout of TGF- β receptor I in mice results in increased mRNA transcripts specific to brown adipose tissue in certain white adipose tissue depots, combined with the appearance of smaller adipocytes and cells resembling brown adipocytes. Various cell populations from the knockout also show increased levels of brown adipose tissue markers. Importantly, knockout mice fed a high-fat diet had leaner body composition, weighed less and showed better glucose tolerance than control mice.

Collectively, these presentations showed a small sampling of the exciting and diverse areas of research currently under investigation at NIDDK. Although questions and additional work remains, each of these investigations has either commercial or medical translational potential. It is great to be surrounded by so much talent and the continuing development of these research projects will be interesting to follow.

Poster Presentations

By Emily Webber

There were a lot of well-put-together posters at the NIH retreat this year. As a neuroscientist, I focused mainly on the brain-related research going on at the NIDDK. There were a number of posters from Dr. Kravitz's group that merit attention.

The Kravitz group is primarily interested in basal ganglia involvement in movement, emotionality and obesity. One of this year's poster winners, Dr. Kim LeBlanc, presented exciting work on optogenetics and anxiety. Specifically, she showed that optogenetic stimulation of the D2 receptor cells within the striatum cause an increase in anxiety-like behavior. D2 receptor cells make up the "indirect pathway," which is a major portion of the voluntary motor system in the basal ganglia. This work demonstrates an important link in the neural circuitry of movement and emotion. Future work will examine these effects in more detail.

Dr. Danielle Friend is from the same group and she showed that deletion of D2 receptors from medium spiny neurons in the striatum caused increases in immobility, similar to mice made obese with a high-fat diet. These results were unexpected, because the D2 receptor cells within the "indirect pathway" are thought to inhibit voluntary movement. However, this enthusiastic young researcher is spearheading a collaboration to explore the potential role GABA in these effects with promising success.

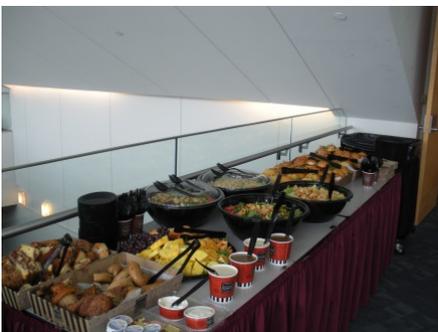
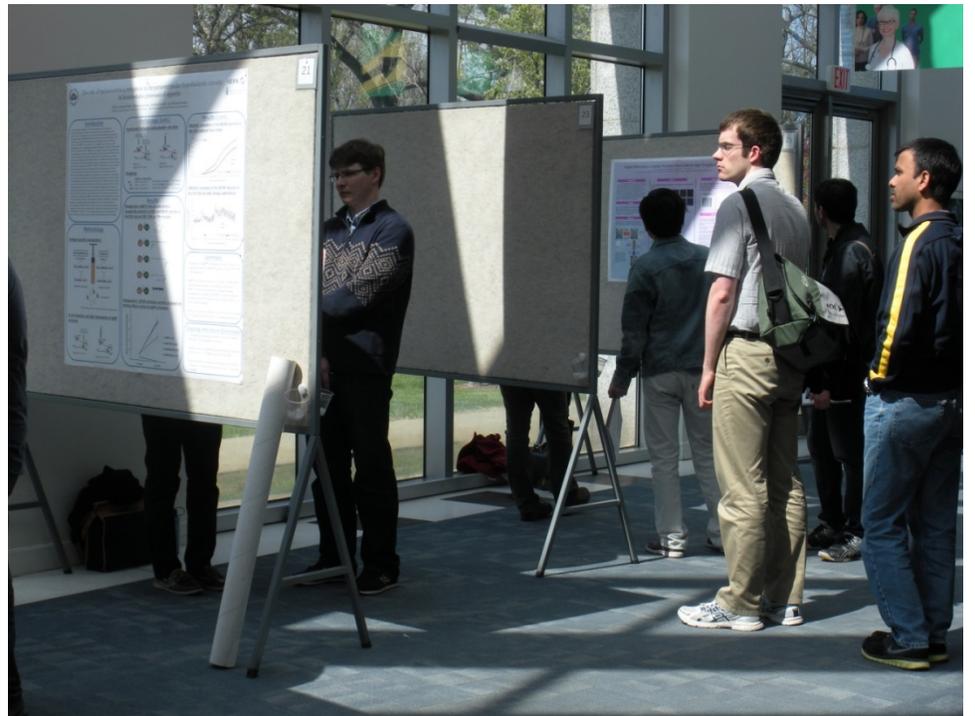
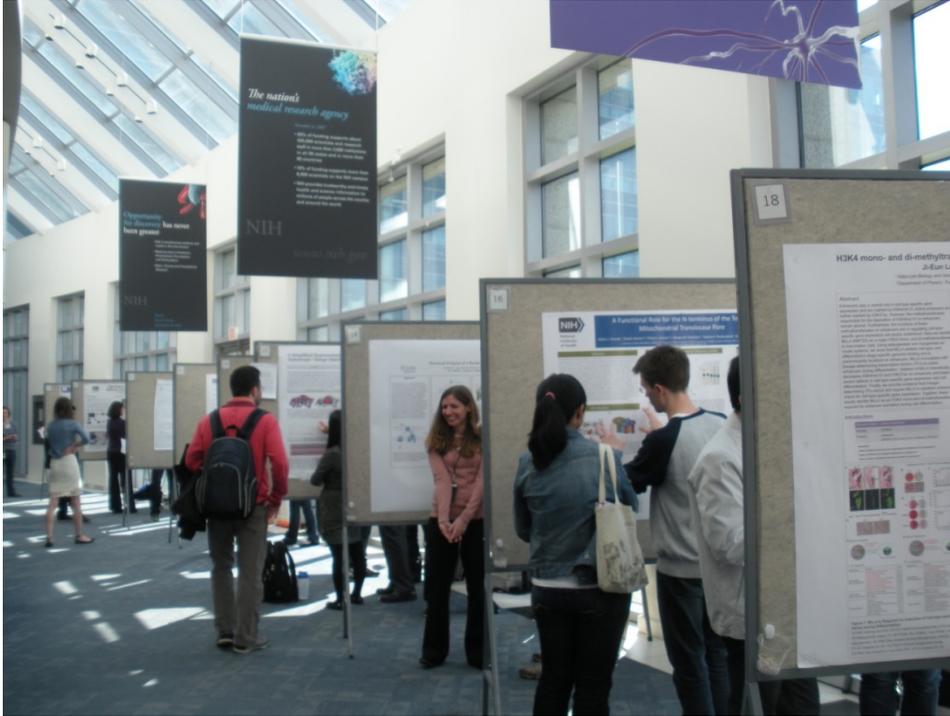
Kavya Devarakonda, a post-bac in the Kravitz lab, has also proven herself to be a rising star in the research arena. Kavya has developed an operant chamber using low-cost hardware and open-source software. She refers to her invention as OperDuino. The main components of her design include a standard bucket, an Arduino

microcontroller with LCD screen, a touch sensor, small water bottle to deliver sucrose solutions, and a power source. This behavioral apparatus can be used to train mice to "work" for a rewarding fluid. She presented some preliminary data showing that mice can be readily trained to nose poke for sucrose reward using her apparatus. Kavya managed to put this all together for around \$100, which is drastically cheaper than the commercially available alternatives.

Moving deeper into the brain, Dr. Chia Li from the Krashes lab examined hypothalamic control on food intake using optogenetics. Prior work had shown that AgRP neurons in the arcuate nucleus send inhibitory projections to the paraventricular nucleus of the hypothalamus (PVH), and that stimulation of these projections caused an increase in food intake. This suggested that AgRP "hunger" neurons act to inhibit unknown satiety-promoting cells within the PVH. Dr. Li performed an elegant experiment to help determine which molecularly defined cell types produce satiety in the PVH. First she identified neurons that express MC4 receptors as ideal candidates; then she excited the inhibitory AgRP → PVH "hunger" neuron projections while she simultaneously excited the potential "satiety" MC4 receptor neurons within the PVH. The excitation of the "satiety" neurons within the PVH during stimulation of the "hunger" projections partially occluded the effect originally seen only with AgRP → PVH "hunger" stimulation. She has produced strong evidence that MC4 receptor neurons and AgRP neurons within the PVH are synaptically and functionally connected, a major step forward in our understanding of "hunger" in the hypothalamus.

Poster Presentations

Pictures!



Early Career Panel

By Kostyantyn Bobyk

Early Career Panelists represented were: (1) tenure-track Assistant Professor from Oregon State, Sandra Loesgen (SL). (2) non-tenure track Assistant Teaching Professor from Carnegie Mellon, Gloria Silva (GS). (3) Senior Research Scientist from Abbvie, Marcela Herrera (MH). and (4) Patent Examiner from the United States Patent and Trademark Office, Emily Cordas (EC). The session kicked off with a brief intro statement by each of the panelists followed by the Q&A period. With enthusiasm panelists shared their professional experiences prior to and at their current positions as well as offered ideas on what fellows could do to increase their chances for success in breaking into the showcased careers.

Prior to her current position: (1) SL has been involved in basic and translational biomedical research while postdocing for a few years; while at NIH wrote a K99 grant, which got scored yet did not get funded, however, SL believes it might have helped with getting her current job. (2) GS has been active in biomedical research focused on the discovery of bioactive natural products and the development of molecular probes for about three decades in Argentina and the US, all while building up an extensive teaching experience via teaching and developing new graduate and undergraduate courses and workshops. Immediately prior to her current job, she started teaching part-time at Carnegie Mellon before deciding to do it full-time. (3) MH has gained expertise in *in vitro* and *in vivo* renal physiology and kidney diseases while postdoc-ing for a few years; she received a K99 and used it for one year in 2013 before deciding to give it up to pursue opportunities in industry. (4) EC has been involved in basic biomedical research while postdoc-ing at NIDDK; served in FelCom and, briefly, as an editor for the *iNFORMER*; interned in the NIDDK Extramural Review Branch during the last postdoc year.

At her current position: (1) SL juggles a small molecule drug discovery research program by writing grants on a daily basis and training graduate and undergraduate students. She enjoys the freedom of her intellectual endeavor and the flexible work schedule, as well as working with and being around young people. (2) GS teaches several (e.g., 5 at a time) courses at the

undergraduate and graduate level, develops new courses and serves as a Faculty Senator and a member of the Faculty Committee and Students Affairs Council. (3) MH works on the development of new therapies for chronic kidney diseases, manages two associates and serves externally as a scientific reviewer for several journals as well as a member of several committees at scientific societies and associations. (4) EC does office work, which involves examining patent applications, interviewing patent attorneys, writing office actions and staying on top of laws, regulations and policy changes in patent procedures.

Some of the ideas and advice brought up during the Q&A period:

- The sooner you know what you want to do the sooner you will start building the skills necessary to get to that position. Act as soon as possible to gain the missing skills.
- Be on top of your science and pubs but seek outside-of-the-bench experiences while at NIH: e.g. attend career development workshops, write a K99, do a DETAIL/internship/volunteering, serve on a committee, teach at FAES etc. These experiences help you to build skills for your CV/resume and give you a glimpse and a taste of what your potential future career might be like.
- Develop connections through networking, volunteering or part-time employment. Later these connections become more likely to lead to your next job.
- To refine your CV/resume properly, talk to people employed in positions similar to one you are applying for, or try to get the scoop on what the hiring managers for similar positions are usually looking for. Then gain those qualifications and customize your resume accordingly and very thoroughly to be a good fit and to stand out.
- Have a positive attitude and be productive at whatever you choose to do. Being a good communicator and playing well with others is valued in all careers: academia, government or industry.

Good luck, fellows!

Income inequality + food deserts – food stamps = obesity. It's much more complicated.

By Joseph P. Tiano

Income inequality both globally and within the U.S. is on the rise. Just this year a study by Oxfam International reported that the 85 wealthiest individuals in the world are worth more than the bottom 50% of the world's population – 85 people have more wealth than 3.5 billion people. Among the 34 countries who are members of the Organisation for Economic Co-operation and Development (OECD), an international economic organization founded in 1961 to stimulate economic progress and world trade, the U.S is ranked 26th in income inequality. In 2010 the top 1.0% (income > \$340,000) of the United States' wealthiest individuals owned 35.4% of the nation's total wealth – more wealth than the entire bottom 90%. In 1980 the top 1.0% only owned 20.5% of the nation's total wealth. Chief executive officer salary has risen from about 50 times that of the average worker in 1980 to around 200 – 250 times the average worker in 2010. Not only is income inequality hurting people and families financially but it is strongly associated with poorer health, especially obesity.

Income inequality is associated with increased obesity

Obesity prevalence in all age groups, sexes, races, ethnicities and income groups has been increasing

steadily since the 1980s. However, the percent increase in obesity prevalence between income groups has not been the same. From 2003 to 2007 obesity prevalence for U.S. children in low-income families increased 23% – 33% compared to just 10% for all U.S. children. Children raised in low-income household are 3.4 – 4.3 times more likely to be obese than children raised in higher income households. Unfortunately, the income disparity persists well into later life: around 15% of low-income individuals over 50 years of age are diabetic (the number one complication of obesity) compared to just 5.5% - 7.4 of higher income individuals; about 20% of low-income individuals over 35 years of age have high cholesterol (a complication of obesity and risk factor for heart attack) compared to just 12% of higher income individuals; and the prevalence of obesity is 1.3 – 1.6 times greater in low-income individuals compared to higher income individuals at any age (Table 1). These disturbing trends are not unique to the U.S. Less affluent individuals are more likely to be obese in Canada, South Korea, Hungary, Australia and England. Even more disturbing is that these inequalities have remained fairly stable for the last 15 years. A final caveat is that the obesity disparities persist in countries with universal health care (Canada and England).

TABLE 1—Prevalence of Health Outcomes Among Female Respondents, by Income Tercile and Age Group: US National Health and Nutrition Examination Survey (1999–2006)

Health Outcome and Age, Years	United States (n = 36 360), %			Health Outcome and Age, Years	United States (n = 36 360), %		
	Low	Middle	High		Low	Middle	High
Diabetes				Hypertension			
12-19	0.6	0.3	0.5	12-19	0.4	0.3	0.5
20-34	1.1	2.2*	0.5	20-34	3.6*	2.6	1.3
35-49	6.3**	2.2	1.7	35-49	23.8*	17.0	17.8
50-64	15.0**	7.3	5.5	50-64	53.0**	50.0**	38.6
65-80	14.3**	15.0**	7.4	65-80	78.9*	76.1	70.1
Obesity				Heart attack			
4-11	15.3**	10.9	10.2	20-34	0.7	0.5	0.3
12-17	17.3**	18.0**	10.5	35-49	2.3	1.4	1.2
18-34	35.5**	31.6**	21.4	50-64	8.9**	4.4	2.0
35-49	45.2**	35.0	30.8	65-80	18.4**	10.4	7.6
50-64	47.4**	41.5*	31.9	Stroke			
65-80	38.4*	40.6**	29.4	20-34	0.7	0.5	0.2
High cholesterol ratio				35-49	2.5*	1.6	0.6
12-19	6.0**	5.1**	2.4	50-64	5.1**	3.2	1.3
20-34	12.0*	12.3*	7.8	65-80	10.0**	8.3*	4.1
35-49	21.8**	14.4	11.4				
50-64	21.8**	18.6**	12.1				
65-80	19.3*	15.4	13.4				

*P < .05; **P < .01 (for prevalence among low- and middle-income vs high-income individuals).

Martinson, ML. Income inequality in Health at All Ages: A Comparison of the United States and England. *American Journal of Public Health*. Vol. 102, p 2049-2056, 2012

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Cont. from Previous Page**Food deserts and affordable healthy food**

A food desert is a geographic area where healthy affordable food, such as that found in large supermarkets, is difficult to obtain. Food deserts are usually associated with poor urban areas where large majorities of the population do not own cars, but they can occur in poor rural areas if the closest supermarket is >15 miles away. Nationally, low-income neighborhoods have 30% fewer large supermarkets than higher income neighborhoods, although the discrepancy is even greater in urban areas like Philadelphia where low-income neighborhoods have 156% fewer large supermarkets. Fewer large supermarkets mean individuals must obtain their food from smaller non-chain stores – these stores are more expensive and offer fewer choices, most often at the expense of healthy foods like fresh fruits and vegetables. For example, dry goods (flour and oatmeal) cost 10% – 40% less at large supermarkets compared to small stores. This is due in part to smaller stores predominately offering leading brands (as opposed to cheaper generic brands); the lack of options for bulk purchases (usually cheaper than single-serve purchases); and the increased crime (theft of food) in low-income neighborhoods driving up food costs. In addition, compared to higher income areas, low-income areas have fewer public transportation options and the percentage of individuals without a car (they cannot afford one) is greater making it that much harder to travel long distances to a large supermarket. Check out the USDA's Food Access Research Atlas and their Food Environment Atlas (URL addresses below). They are tools that allow you to create maps showing food access indicators for low-income households along with other characteristics like food choices, health and well-being.

There are a few contrasting studies that show that proximity to supermarkets (food deserts) is not associated with obesity. There is even one study that shows that living closer to large supermarkets is associated with obesity. Preschool-aged children living less than one mile from a supermarket had a slightly higher body mass index (BMI) than those living greater than 2 miles from a supermarket. Lastly, there are studies that show high- and low-income individuals consume roughly the same number of calories of carbohydrates, fats and proteins along with the same

amounts of fruits and vegetables despite the increased prevalence of food deserts in low income areas. These conflicting studies highlight the difficulty in distinguishing between causal effects and non-causal associations in large, observational and poorly controlled human studies.

Other contributing factors

Food deserts and the proximity to supermarkets is only part of the story. Low-income urban neighborhoods have higher crime rates – particularly more violent crimes – making walking longer distances (to a supermarket) or exercising outside less desirable. In addition, the available parks and recreation areas are usually fewer in number and less maintained than those in higher income neighborhoods, further discouraging outside physical activity, especially among children. Lastly, compared to higher income households, low-income households are more likely to have one or both parents working low-paying shift jobs (retail or restaurant) or even multiple jobs. They are also much more likely to be single-parent households. Thus, there may be inadequate time (and money) for personal exercising, taking kids to the park, or cooking healthy meals (which are frequently replaced with fast food). Any single factor is not likely to have a significant effect on the increased obesity prevalence observed among low-income individuals, but when multiple factors are combined together a clearer picture emerges as to why the obesity prevalence is higher among low-income individuals.

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Cont. from Previous Page**Could it be due to lower education instead?**

Low-income individuals are also much more likely to be less educated than higher income individuals – lower education is also strongly associated with increased obesity. For example, the same study that found that low income individuals were more likely to be obese in Canada, South Korea, Hungary, Australia and England also found that less educated people in those same countries were more likely to be obese. In addition, poorly educated individuals were 3.2 and 2.8 times more likely to be obese than well-educated people in France and Sweden, respectively. Thus, it is difficult to really determine the relative contributions that income and education play in determining an individual's likelihood of becoming obese. However, a study from Spain found that education inequality was responsible for about 50% of the observed obesity disparity between low and higher income individuals and that education was much more important than income as a predictor of obesity. In contrast, the same study that showed high- and low-income individuals consume roughly the same number of calories of carbohydrates, fats and proteins and the same amounts of fruits and vegetables also showed that there was no difference in food consumption between individuals with a high school degree and those with a college degree. Like most aspects of socioeconomic-driven effects, the increased obesity prevalence among those individuals on the lower end of the socioeconomic ladder is likely a combination of less education, lower income and many other factors working together.

What needs to be done?

A starting point would be to reduce the number and size of food deserts and increase access to healthy food for everyone. In 2010 Walgreens launched a small pilot program to do just that. They chose 10 of their locations in Chicago located in food deserts and started offering an expanded food selection including fresh fruits, vegetables and fish. Since then Walgreens has expanded its efforts by offering increased food choices in stores located in food deserts in Denver, St. Louis, Detroit, San Francisco, Oakland and Indianapolis. They plan to convert around 500 of their 7,800 stores – those in low-income food deserts – into what they are calling “food oases.” Not to be left out of an emerging market,

Save-A-Lot plans to open 500 stores in food desert neighborhoods by 2015 and Wal-Mart has made a similar commitment, saying it will open around 300 mini-stores in food desert neighborhoods by 2016.

A second option, one that would probably have a much more significant effect, would be to fix the education gap between low and higher income individuals – an easy solution to propose but a very difficult one to implement. For more information on improving education read my previous article from volume 6, issue 3 (link below).

Food Stamps

SNAP is funded through the farm bill which is the primary agricultural and food policy tool of the federal government. The food stamp program was implemented in the 1940s to provide food-purchasing assistance to low-income individuals but more recently it has been tied to the obesity epidemic, both positively and negatively. Food stamps account for the largest portion of the bill (close to 80% for FY 2014-2023). In 2013 SNAP cost \$76.4 billion and supplied around 47.5 million low-income people with money to purchase food. Critics of the program point to its lack of nutritional standards as promoting obesity since food stamp recipients can purchase unhealthy foods (frozen dinners) and beverages (soft drinks) as opposed to healthy fruits and vegetables. Former Mayor of New York City Michael Bloomberg in 2011 tried to ban the use of food stamps to purchase “sugar-sweetened beverages” but the proposal was rejected by the United States Department of Agriculture (USDA). In early 2013 eighteen mayors (New York, Los Angeles, Chicago, Boston, Baltimore, and 13 others) sent a letter to Congress asking for a ban on the use of food stamps to purchase “sugar-sweetened beverages.”

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Studies on food stamp recipients have refuted critics' claims that food stamps promote obesity and in fact show the opposite – that food stamp recipients have a decreased risk for obesity. For example, food stamp dollars received are positively associated with higher scores on the USDA's Healthy Eating Index (higher is healthier); adults receiving food stamps for greater than 6 months have lower BMIs than those who have received food stamps for less than 6 months, adults over 54 who receive food stamps are less likely to be overweight than those who do not; and the BMI of women receiving greater than \$150/month in food stamps is significantly less likely to be obese than women receiving less than \$150/month in food stamps. It is important to note that in all these studies the researchers tried to control for confounding variables such as economic situation, health status, food security status and motivation to enroll in the program.

On February 7, 2014 President Obama signed the 2014 U.S. Farm Bill (Agricultural Act of 2014) into law enacting a wide set of policies including an \$8.6 billion cut to the food stamp program over the next 10 years. *The New York Times* reports that the cut will result in 850,000 households losing \$90/month in food stamp benefits. According to the available studies the loss of

food stamp funds should contribute to the growing obesity epidemic but since there are so many other contributing factors (education, income, food deserts, diet, exercise, genetics) it is unfair to single out any one factor.

References...

What is a food desert – the details?

<http://www.fns.usda.gov/tags/food-desert-locator>

USDA Food Access Research Atlas

<http://www.ers.usda.gov/data-products/food-access-research-atlas.aspx>

USDA Food Environment Atlas

<http://www.ers.usda.gov/data-products/food-environment-atlas.aspx>

Income inequality

<http://www2.ucsc.edu/whorulesamerica/>

STEM education in the U.S.: Are we falling behind the rest of the world?

http://fellowshipoffice.niddk.nih.gov/newsletter/old_html/vol6iss3/page9.html

Food Stamps

[http://frac.org/wp-](http://frac.org/wp-content/uploads/2011/06/SNAPstrategies.pdf)

[content/uploads/2011/06/SNAPstrategies.pdf](http://frac.org/wp-content/uploads/2011/06/SNAPstrategies.pdf)

<http://www.ers.usda.gov/publications/err-economic-research-report/err147.aspx>

Scientists with borders

By Christine C. Krieger

The business of state

Earlier this April, NIH's Division of International Relations sent out a memo concerning "general guidelines for activities with Russia and Russian researchers." The complete memorandum, shown below, describes instructions given by the State Department to limit interactions with our fellow scientists in Russia.

These guidelines have been issued in response to events in Ukraine. Crimea, a region in Ukraine that has an approximately 60% ethnic Russian population, wishes to secede from Ukraine and join Russia. At the time this article was written, Crimea was planning to hold a referendum on this issue, a referendum which, according to a U.S. State Department press release, will "violate international law and the territorial integrity of Ukraine." The situation has degraded to a point where even the bastions of science cannot escape the political consequences.

The progression of science

After careful reading of the NIH memorandum, you would see that these guidelines do not prohibit collaborations with Russian scientists. First and foremost, NIH grants to Russian institutions will continue to be funded. Existing collaborations can continue unabated, only new projects are suspended. Special permission to travel to Russia can be granted on a case-by-case basis.

Procedural discussions can be conducted through the secure servers, and the ever-helpful staff at HHS is on hand to forward communications to the Embassy in Moscow. However, in response to the question of whether discussions concerning scientific research are considered procedural or policy discussions, the Division of International Relations replied that a "majority of Russian researchers will be working for a Russian government institute or entity. Development of new collaborations with these organizations is suspended." This broad statement, strictly interpreted, could make the act of emailing a former lab-mate about their opinion on a recent stem cell publication a violation of these guidelines. **Please contact Dr. Marya Levintova, Marya.Levintova@nih.gov, with any questions.**

For more information

On the Illegal Referenda in Eastern Ukraine <http://www.state.gov/r/pa/prs/ps/2014/05/225945.htm>

Statement by the Press Secretary on Ukraine

<http://www.whitehouse.gov/the-press-office/2014/04/28/statement-press-secretary-ukraine>

Guidelines for activities with Russia

Dear IC reps,

Please see below the general guidelines for activities with Russia and Russian researchers. This guidance is to help your IC as you determine if specific activities should or should not be undertaken in the near future.

The following guidelines are based on the NSC and State Department guidance and are to be followed unless we are given special permission not act otherwise. **Special requests are to be evaluated on a case-by-case basis.**

G8: All USG activities where Russia is a participant or host are suspended. All communications/discussions/negotiations regarding G8 activities are suspended until further notice.

Travel: All USG travel to Russia is suspended until further notice. NCS will review special requests regarding travel on a case-by-case basis.

Grants: Grants to Russian institutions awarded through regular NIH funding processes are allowed to proceed forward.

New initiatives/programs: All negotiations of MOUs and other arrangements with GOR/government research institutions are suspended until further notice. Development of new RFAs is suspended until further notice.

Communications: We are not to communicate either by phone or email with GOR representatives to discuss any new initiatives or activities. Any regular business discussions with the U.S. Embassy staff can be conducted through the regular lines of communication. Any procedural or policy discussions need to be conducted through the secure servers (the staff at OGA/HHS or State Department are available to send such information to the Embassy in Moscow).

*Specific instructions are available regarding the NIH/OAR-Russian Foundation for Basic Research HIV/AIDS collaborations – OAR/NIH is allowed to continue planning the collaboration meeting for September 2014.

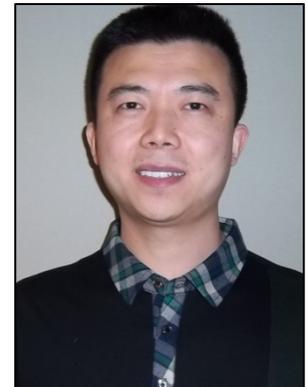
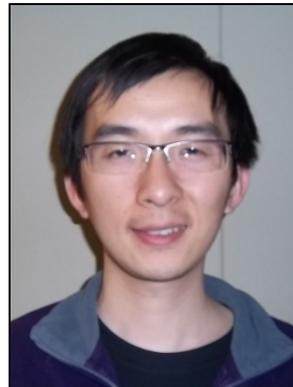
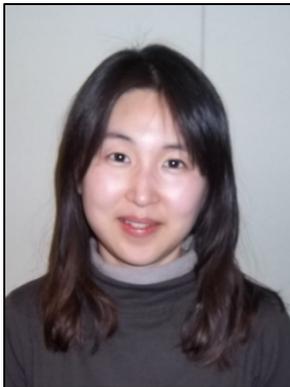
*Specific instructions are available regarding NIH staff participation/travel to Moscow for the EECAAC meeting in May, 2014 – NIH staff are allowed to travel to Russia to participate in the EECAAC meeting in May 2014.

If you need additional information or have requests that need to be submitted to the NSC and State Department, please let me know.

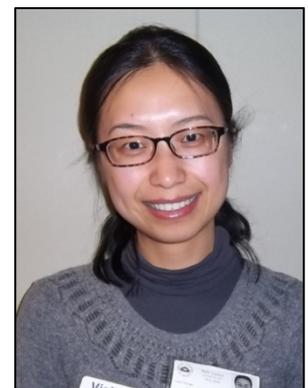
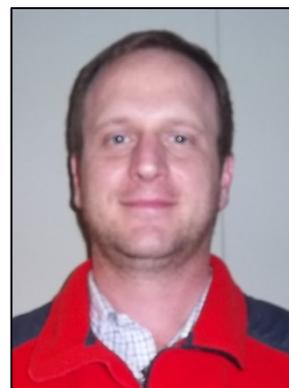
Please let me know if you need additional information or have any questions,
Marya

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Welcome New Fellows



Ha Youn Shin	Binbin Lai	Poorni Adikaram	Limin Wang
IRTA	Visiting Fellow, China	IRTA	Visiting Fellow, China
PhD, Stony Brook University	PhD, Peking University	PhD, University of Maryland (College Park)	PhD, Wuhan University
Laboratory of Genetics and Physiology (Hennighausen) Bldg 8	Laboratory of Endocrinology and Receptor Biology (Kai Ge) Bldg 10	Metabolic Diseases Branch (Simmonds) Bldg 10	Laboratory of Endocrinology and Receptor Biology (Kai) Bldg 10



Yang Gao	Pundrik Kumar Jaiswal	Dylan Murray	Susu He
Visiting Fellow, China	Visiting Fellow, India	IRTA	Visiting Fellow, China
PhD, Iowa State University	PhD, Indian Institute of Technology, Chennai	PhD, Florida State University	PhD, INSA, France
Laboratory of Molecular Biology (Yang) Bldg 5	Laboratory of Cellular and Developmental Biology (Kimmel) Bldg 50	Laboratory of Chemical Physics (Tycko) Bldg 5	Laboratory of Molecular Biology (Dyda) Bldg 5