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## The NIDDK iNFORMER Newsletter - December 2011/January 2012

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Meet NIDDK's Clinical and Acting Scientific Director, Dr Jim Balow, on page 2.



K99 awardee Maggie Johnson. Page 4.



See page 3 for volunteer opportunities for fellows



New NIDDK fellows, new newsletter editors and a new FelCom rep. Meet them all on page 5.



### Special points of interest:

- Nossal Award winners
- Hear from the Scientific & Clinical Director
- Volunteer opportunities for Fellows
- K99 winner
- The iNFORMER needs your lab images!
- Tell us what you think about human tissue donation

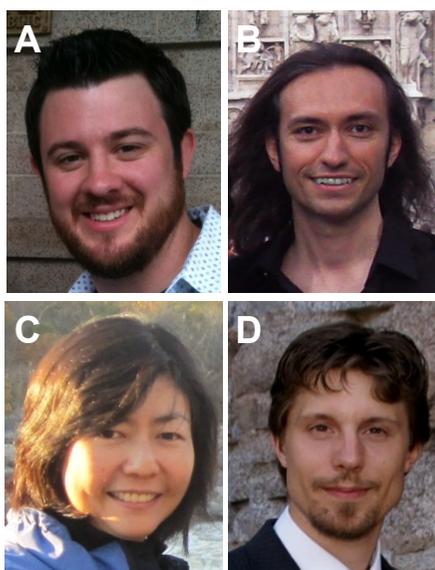
### Events Calendar

Thurs Jan 12th	FelCom New Year's Party
Wed-Thurs Jan 18th-19th	NIH fellows' blood drive
Thurs-Fri Apr 26th-27th	NIDDK Annual Fellows' Retreat

### Fellowship Office news

#### Nancy Nossal Award Winners

The Nancy Nossal Award was established to honor the memory of Dr. Nancy Nossal, who exemplified an enduring commitment to excellence in mentoring. Between 8 and 12 awards are made each each year to eligible clinical and postdoctoral fellows. The highly competitive award is aimed at the top 10% of fellows. The awardees of the September 2011 competition are Nick Anthis (A), Matteo Avella (B), Ling Chin Hwang (C), and Simon Messing (D).



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**The iNFORMER**, is a monthly newsletter published by the Fellows Advisory Board (FAB) in collaboration with the NIDDK Fellowship Office. If you would like to participate in writing newsletter articles or have questions or comments, please contact any of the following members.

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## All The World's A Stage – An interview with Dr Jim Balow, NIDDK Clinical Director

by Carla Prado and Matt Wenham



especially those who see themselves in administrative roles in the future. "We all have similar vulnerabilities as our predecessors, and if we don't have a sense of history we're likely to make similar mistakes."

Dr Balow arrived at NIH in 1972. With a medical degree from his native Minnesota, he had come to Washington as a nephrology fellow at Georgetown University, leading to a research fellowship in immunology at the NIH. Despite this title, Dr Balow's expertise in nephrology was highly sought after, and he soon found himself being called on for renal consults, kidney biopsies and pathology interpretations, in addition to his lab work. The years following saw him bounce around several 'temporary' and short-term appointments, including a stint as director of an extramural kidney disease program, and the chance to establish a research program in lupus nephritis. In 1988, Dr Balow was appointed Clinical Director of the clinical nephrology program at the National Institute of Arthritis and Metabolic Diseases, the predecessor institution to today's NIDDK.

The pathway to administration was never a preplanned one for Dr Balow. He sees his leadership role in the Institute as a chance to give something back, and to help use the management skills and experience he has acquired over decades at NIH to 'protect' the research at NIDDK. He feels that building a career focused on serving others is the best

way to ensure your own success in life. Humility is clearly one of Dr Balow's attributes, and he stresses that while talent is essential for success, the people who make the biggest mark on their fields recognize that luck plays a large role. He cautions younger scientists to be wary of egocentric individuals who think they are responsible for all the success and creativity of a group or lab - stick with those who appreciate their own talent and hard work but can see the role of luck and others' work in their success. In a similar vein, he advises administrators and leaders to surround themselves with people who will tell you the truth, not just what you want to hear. It is also critical to respect the value of working with a diversity of disciplines - in order to be successful in the scientific enterprise, you need both depth of expertise and breadth of perspectives from multiple disciplines.

On the practicalities of working as NIDDK Clinical Director, Dr Balow spoke about his most recent work with the former Scientific Director, Dr Ira Levin, to prepare NIDDK for expected lean budgetary times ahead. Despite some blunt and critical conversations, he and Dr Levin worked carefully over the last three years to keep NIDDK staff informed about changes to programs and budgets, and Dr Balow feels this has kept the Institute well prepared and adaptable to the difficult changes now facing other NIH ICs. Dr Balow is acutely aware of the conditions facing fellows, both in terms of

flattening stipends and strained budgets for research resources. He sees his role as Scientific Director to advocate for adequate resources to be allocated to early and mid-career fellows, so that they can advance their careers at such a critical stage.

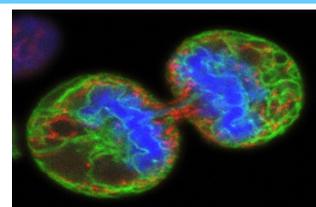
Looking to the future, Dr Balow sees both promise and challenges. Although the potential of medical technology is high (Dr Balow points to fields such as gene therapy and personalized medicine), the costs related to these technologies are staggering. Figuring out how to provide these new types of medicine to a growing global population within tightened budgetary constraints will be a formidable task. Dr Balow also believes the status of scientific research in the public's eye is slipping, both in developed countries like the US and emerging economies such as China. Again, failing to deliver on promised treatments (such as gene therapy) has led to increased public skepticism about the cost benefit return of funding medical research. Despite these challenges, Dr Balow views the work done at institutions like NIDDK as critical for improving the human condition. Hopefully an appreciation of Shakespeare will continue to help Dr Balow navigate the difficult waters ahead and see NIDDK through the tempest.

Shakespeare is perhaps an unlikely guide for someone responsible for leading an NIH intramural research program. But for NIDDK Clinical Director - and currently acting Scientific Director - Dr James Balow, The Bard has much to teach scientists and clinicians alike. *The iNformer* sat down with Dr Balow - NIH's longest serving Clinical Director - to see what other advice he had to offer NIDDK fellows, Shakespearean or otherwise.

Take, for example, the danger of hubris - a subject much explored in Shakespeare's works. Dr Balow cautions that a feeling of superiority or excessive pride can lead scientists to forget that their work requires the trust (and financial support) of the public. This appreciation should remind us that we need to ensure our research is communicated effectively to the public, but not in a way that oversells the promise of potential benefits. The character flaws of Shakespearean figures also serve as a lesson for researchers,

**SEND US YOUR  
IMAGES!**

Do you have a great picture of a gel, a fluorescent cell, or a beautiful diagram that you are looking to share? We are looking for pictures for the next issue of the INFORMER. Please email them to Emily at [cordase@niddk.nih.gov](mailto:cordase@niddk.nih.gov)





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**Inspiring Lifelong Learners with the Children's Science Center** *by Michelle Bond*



As a member of the NIH community, you are acutely aware of the importance of science, technology, engineering, and mathematics (STEM) in our every day lives. Thus, it is discouraging that the United States is currently struggling to remain competitive in STEM areas. Indeed, the US is ranked 24<sup>th</sup> in science literacy and of 4 million children who start pre-school each year, only 4.5% graduate college with a STEM-related degree. These statistics reflect a growing gap in the American STEM workforce – and calls into question the future global competitiveness of the United States.

Ensuring excellence in STEM education is critical for improving science literacy and necessary to secure the United States a position at the forefront of innovation. Inspiring a love of learning and maintaining interest in STEM subjects at an early age is critical – Department of Education statistics show that a large percentage of students lose interest in STEM by the third grade. Beyond effective STEM education in the classroom, informal

STEM education provided by museums and other mediums is a growing approach for effectively exciting early, elementary school learners.

The [Children's Science Center](#) is among the region's organizations dedicated to nurturing young scientists, engineers, and mathematicians. The Center's mission is to inspire a love of learning and STEM literacy in all children through meaningful creation, exploration, and discovery. This interactive children's museum is planned for Northern Virginia. As it prepares to open its doors, the Children's Science Center is a committed community resource that currently provides excellent STEM-related programming to children and their families through its Museum Without Walls program.



The Center's Museum Without Walls program that brings hands-on STEM-related activities to visitors at local schools and regional events including [The Big Build](#) at the National Building Museum and the 2<sup>nd</sup> Annual [USA Science & Engineering](#)

[Festival](#) (USASEF). Indeed, we are excited to teach visitors about earthquake basics using interactive activities in partnership with Network for Earthquake Engineering Simulation at the 2012 USA SEF! Also, the Children's Science Center has recently expanded its programming to include Mobile Labs Family Science Nights for area elementary schools, public libraries, and Scout troops.

For the Museum Without Walls programming, the Children's Science Center relies on a dedicated corps of volunteers to staff event booths and develop STEM-related curriculum. **We need your help for our always expanding programming – please consider joining us at USASEF April 27-29, 2012 or another event!** Along with general volunteers, the Children's Science Center needs specialized professionals to diversify the volunteer corps – for tasks ranging from curriculum development and grant writing to donor relations. **Please help us 'spark'**

**children's love of learning and interest in STEM by volunteering!** For more information or to volunteer, please contact: Michelle Bond, Children's Science Center Volunteer



**children's science center**  
EXPLORE. CREATE. INSPIRE.

Coordinator (bondmr@mail.nih.gov) or Volunteer@TheChildrensScienceCenter.

**Outreach at the NIH Children's Inn** *by Olga Pavlova*

The NIH Children's Inn is a place where kids with unusual diseases stay with their families while they undergo experimental treatment here at NIH. Kids arrive here from all over the world and for a while the Inn becomes their home and their school - as well as the place to have some fun.

About a year ago OITE started a Children's Inn volunteer program. Once a month, two NIH Fellows prepare a hands-on science class and teach it at



the Inn. In September it was mine and Matt Wenham's turn. The most challenging aspect was that we did not know until the moment the class started how many kids would be coming, what age they would be, or what language they would speak. One of the groups ahead of us ended up teaching a group entirely of Dutch kids and no, the fellows did not happen to speak Dutch!

We decided to talk about gases and the changes in the content of the air that we breathe out. The hands-on activity would include kids breathing into water with pH indicator and observing color change as carbon dioxide was being dissolved. We would also talk about different states of matter, with dry ice representing the solid state of the carbon dioxide gas. We arrived at the Inn with two boxes full of tubes, gloves, glasses and pasteur pipets. That evening two girls came to participate, aged 5 and 12. The room also filled with parents and Children's Inn staff. We showed a few slides, did our "experiment" and even recorded the results. It is amazing how excited about science you can get both kids and adults with just a piece

of dry ice dropped in a beaker of water. The older girl screamed "Mom, look, it's like they do in the X-Files". Hopefully, this way they can remember what they learned as if they saw it on *The X-Files* or *CSI* TV shows.

We thoroughly enjoyed our time at the Inn, particularly the excitement with which the kids responded to our activity. We would encourage other postdocs to participate in this or similar outreach activities as a way of sharing their interest in science with children. Fellows interested in the Children's Inn in particular should contact Erika Barr at OITE to find out about future opportunities.



**Part of the experiment featured a dry ice-created mega bubble**



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## A Closer Look—K99 awardee Maggie Johnson by Matt Wenham



NIDDK has a new winner of the prestigious K99/R00 Pathway to Independence grant – Laboratory of Chemical Physics postdoc Maggie Johnson. Maggie was selected for the award, which provides support for postdoctoral fellows to transition from mentored research to establishing their own independent research group, by the National Institute for General Medical Sciences (NIGMS).

Maggie's path to the NIH was a somewhat unusual one, beginning with an undergraduate degree from Columbia University in applied mathematics. Despite her mathematical origins, Maggie knew from early on she wanted her work to have relevance to biological problems. After conducting undergraduate research in the mathematics and bioengineering departments at Columbia, Maggie undertook a summer internship at NIH with NIDDK investigator Dr Phil Anfinrud. Coming full circle, Maggie is

now a postdoc with Dr Gerhard Hummer in the same building as Dr Anfinrud.

After graduating from Columbia, Maggie moved west to start her PhD at the University of California, Berkeley with Prof Teresa Head-Gordon in the Department of Engineering. Her thesis work involved computational and theoretical study of the structure and dynamics of water molecules, both in bulk water and at interfaces with proteins. This work helps to provide understanding and models of how water can have influence over macromolecular interactions such as protein folding and complex formation. Her postdoctoral work at NIDDK looks at larger scale cellular biophysical modelling of protein interactions inside the cell. Specifically, Maggie and Dr Hummer hope to understand how protein binding (especially non-specific binding) influences equilibrium reactions, and the role played by protein concentration and topology in these systems.

For her K99 grant, Maggie proposed a research project looking at a specific cellular event, the formation of clathrin protein coats to form endocytic vesicles at the plasma membrane. Although this system has been well studied experimentally, Maggie explains that modelling is a good way to determine how the process proceeds in terms of interactions between the 40-odd proteins involved and how the coat is nucleated. "We want good resolution from our model over long time scales, but with the number of proteins involved this type of modelling can be difficult and slow," she says, adding that this field is less developed than other types of modelling.

Another slow process was that of applying for her K99 grant. Maggie first applied in October

2010, but didn't receive the final award notification until October 2011. Several rounds of screening, scoring and budget examination had to take place, and Maggie was at one point told that her grant had received a good score but that receiving funding would depend on NIGMS' budget position. Throughout the process, Maggie was in frequent contact with the program officer handling her application – something she recommends for other applicants. "Speak early and often to your program officer and ask questions. This can save time later on," she suggests.

For prospective K99 applicants, Maggie offers a few other pieces of advice. "You need to balance when to apply. You generally need at least one publication with your postdoc advisor, but you don't want to wait too long," she observes. Applicants also need a good collaborator outside NIH. For Maggie, this will be Dr Lynton Traub at the University of Pittsburgh, who is an expert in clathrin endocytosis, and will provide experimental data to help parameterize and validate her models. By good fortune, Maggie's father is a physiologist at UPitt, so her trips to Pittsburgh to visit her collaborator will also allow her to see her family. Finally, Maggie suggests thinking carefully about the training component of the K99 application. "This is one of the most common areas for rejection – the reviewers want to see reasons why you need more training, since the K99 is a training award." She recommends trying to show you're doing things other postdocs aren't, like organizing journal clubs, participating in NIH subject interest groups and taking relevant FAES courses.

## Glucose homeostasis is influenced by TGF-β signaling by Michelle Bond

Transforming growth factor-β (TGF-β) signaling has long been held as a critical component of cell proliferation, growth, and death in diverse cell types.<sup>i</sup> In 2006, Dr. Sushil Rane (NIDDK), began to interrogate the role cell cycle regulators – in particular TGF-β – play during obesity and diabetes pathogenesis. In a recent collaborative study, Rane and colleagues discovered that the TGF-β-SMAD3 signaling pathway is also an important part of glucose homeostasis.<sup>ii</sup> These studies are a significant contribution toward combating the growing health complications brought about by metabolic diseases.

In the study published in *Cell Metabolism* in July 2011, Rane and coworkers first demonstrate that the white adipocytes in *smad3*<sup>-/-</sup> mice had acquired characteristics of brown adipose tissue (BAT) – including a dense mitochondrial population. Moreover, when profiled by microarray, white adipose tissue (WAT) samples from the *smad3*<sup>-/-</sup> mice had an increase in genes characteristic of BAT. The acquired characteristics of BAT in *smad3*<sup>-/-</sup> mice are central to their findings, as BAT, unlike WAT, is responsible for exhausting excess calories. Indeed, when

*smad3*<sup>-/-</sup> mice were fed a high-fat diet, they remained insulin sensitive and gained less weight than wild type mice. These results combined suggest that ablation of TGF-β signaling ameliorates symptoms of obesity and diabetes.

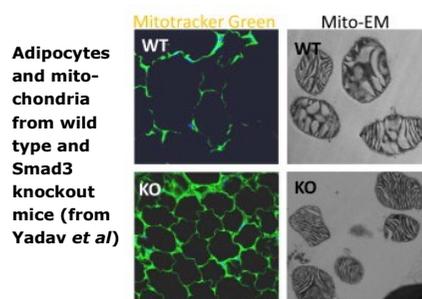
The researchers next treated two well-characterized mouse models of obesity and diabetes with a TGF-β antibody. Ablation of TGF-β signaling protected mice from hepatic steatosis, obesity, and diabetes: antibody administration reduced SMAD3 activation in WAT suppressing body weight gain, fat deposits, adipocyte cell size, etc. Furthermore, antibody-treated mice had reduced inflammatory symptoms – a common characteristic associated with obesity. With a closely-related human version of the TGF-β antibody – Fresolimumab – currently in clinical trials for pulmonary fibrosis, renal disease, and cancer, these data suggest that similar antibody or small molecule treatments may be promising for patients with metabolic disorders.

The data outlined in this study are particularly exciting because they suggest that WAT can be therapeutically manipulated to behave more like BAT. Future studies will focus on

identifying the origin of the "browning" WAT cells. Gaining deep understanding of the TGF-β pathway will be critical before a feasible method to treat obesity and related metabolic diseases will be possible. Rane and coworkers hope to see that cell cycle regulators controlling glucose and energy homeostasis yield an entry for small molecule therapeutics in the future.

<sup>i</sup> Shi and Massagué, 2003. Shi and J. Massagué, Mechanisms of TGF-beta signaling from cell membrane to the nucleus. *Cell*, **113** (2003), pp. 685-700.

<sup>ii</sup> Yadav, H. et al. *Cell Metabolism*. Volume 14, Issue 1, 6 July 2011, Pages 67-79.




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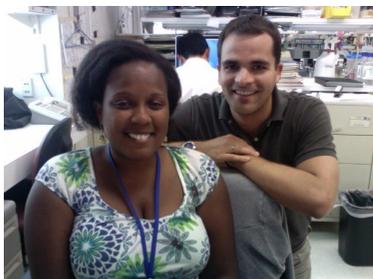
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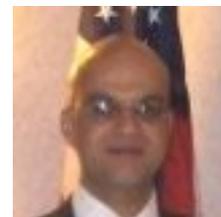
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## Farewells and Welcomes



This issue marks our final edition as editors of *The iNformer*. We have thoroughly enjoyed putting together this resource for NIDDK fellows and hope you have found the last year of newsletters interesting, entertaining and occasionally fun! We're pleased to announce that the editorial roles will be taken up by **Nadine Samara**, **Christine Krieger** and **Emily Cordas**. The February issue will be their first as editors—we wish them all the best!



In other news, NIDDK has a new basic science representative to FelCom (the NIH Fellows' Committee) — **Ahmed Kablan** (pictured at right). Ahmed takes over from Matt Wenham, who has been elected as basic science co-chair of FelCom. Ahmed can be contacted at [qasemah@nidk.nih.gov](mailto:qasemah@nidk.nih.gov).

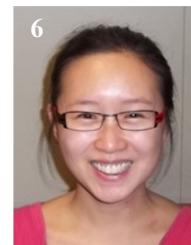
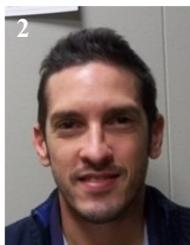
Matt Wenham and Shauna Clark

## Question to the readers

Last December, the NIDDK hosted a conference discussing the use of post mortem human tissue in diabetes research. While use of human tissue provides data more relevant to developing treatments for human disease such endeavors have major disadvantages, namely loss of control. In mouse studies, for instance, researchers can control their subjects' genotype, diet, drug regimen, and general lifestyle. Yet, even with that level of control, scientists are ill-equipped to explain or predict how disease manifests in anything more complicated than an amoeba. Why would anyone believe scientists could do any better using human tissue instead of traditional animal studies? Given the ethical implications and logistical difficulties using human tissue in research, would the benefits really outweigh the costs? Would you be willing to donate your or a loved one's body to medical research?

Agree? Disagree? What do you think? Email your thoughts to [christine.krieger@nih.gov](mailto:christine.krieger@nih.gov). Selected responses will appear in the next *iNFORMER* issue along with coverage of the NIDDK Conference on Human Tissue for Diabetes Complications Research.

## Welcome New Fellows!



The following fellows joined NIDDK in the last two months:

**1. Pankaj Kumar**  
Visiting Fellow, India  
PhD, Chaudhary Charan Singh University, India  
Laboratory of Bioorganic Chemistry ( Appella group)  
Bldg 8

**2. Alejandro Alvarez-Prats**  
Visiting Fellow, Spain  
PhD, UNED ( National University of Distance Education), Spain  
Kidney Diseases Branch ( Star) Bldg 10

**3. Li Fengmin**  
Visiting Fellow, China  
PhD, Georgetown University  
Liver Diseases Branch ( Philpott) Bldg 10

**4. Marvin Bayro**  
IRTA  
PhD, MIT (Massachusetts Institute of Technology)  
Laboratory of Chemical Physics (Tycko) Bldg 5

**5. Shiqian Qi**  
Visiting Fellow, China  
PhD, Tsinghua University, Beijing  
Laboratory of Molecular Biology (Hurley ) Bldg 5

**6. Su Jun Lim**  
Visiting Fellow, Malaysia  
PhD, University of Rochester  
Laboratory of Cellular and Developmental Biology( Lei)  
Bldg 50

**7. Grace Bennett**  
IRTA  
PhD, Tufts University  
Diabetes, Endocrinology and Obesity Branch (Rane)  
Bldg 10

**8. Radwa Noreldin**  
Visiting Fellow, Egypt  
MD, Suez Canal University School of Medicine  
Bioengineering and Biomedical Imaging ( Pettigrew)  
Bldg 10

**9. Chao Zhao**  
Visiting Fellow, China  
PhD, Chinese Academy of Sciences  
Laboratory of Bioorganic Chemistry ( Appella) Bldg 8

**10. Avery Frey**  
IRTA  
PhD, University of Wisconsin  
Liver Diseases Branch (Philpott) Bldg 10

**11. Stephanie Goodwin**  
IRTA  
PhD, Virginia Tech  
Laboratory of Biological Modeling (Hall) Bldg 12A

**12. Kathryn Harwood**  
IRTA  
PhD, University of Massachusetts Medical School  
Laboratory of Cellular and Molecular Biology (Hanover)  
Bldg 8

**13. Hangnoh Lee**  
Visiting Fellow, South Korea  
Laboratory of Cellular and Molecular Biology (Oliver)  
Bldg 50