

# BIOCHEMISTRY & MOLECULAR BIOLOGY TODAY

DECEMBER 2012 NO. 290



## Chair's Message

Even as the holidays draw near and our busy schedules have the added interruptions of parties, shopping, and family obligations, I think it fair to say that as the temperatures drop (not too much, mind you), a special feeling of, can we call it relaxation or anticipation of some days where the expectation is to enjoy ourselves and our family and friends, does pervade the air around us. For some, travel will be involved, while for others – and I am happy to be among those – a few unstructured days at home beckon.

What will the New Year bring? For sure, surprises. I know all about the worries we read about in the newspaper everyday or are repetitively warned about in emails and conversations. But I do know

there will be the now unthinkable or unlikely, both good and bad.

So...let's enjoy our traditional holidays as we learned to do from our older relatives. It is time for tradition and being nice, maybe even silly. So eat a Christmas cookie, light up that Hanukah candle, perhaps overindulge a bit, and spend time with the kids. We all deserve it.

- regino

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### Special Items of Interest

- ✦ Cheryl Watson named Editor-in-Chief of *Endocrine Disruptors*, page 4

## Awards and Announcements

Patent Awarded: **Luxon, B.A.**, Copland, J.A. and Wood, C.G., "Methods for Detecting, Diagnosing and Treating Human Renal Cell Carcinoma", U.S. Pat. App. No. 20050130193, USSN 13/136,588, U.S. Pat awarded (11 Dec 2012).



[Cheryl Watson serving as Editor-in-Chief of Endocrine Disruptors.](#) See Page 4.



### Logo Design Contest

Theme: Integrated Structural Biology

Deadline for design submission: January 4, 2013

[click for details](#)



## Faculty on the Road

**Dr. Bruce Luxon** attended the American Medical Informatics Association annual meeting, Chicago, IL Nov 4-7

He also attended the National CTSA Informatics Key Function Directors meeting, Chicago, IL Nov 7-8 as well as served as Facilitator at the GCC Research Mentor Training Workshop, Tuesday, Dec. 4 in Houston.



**Dr. Muralidhar Hegde** gave an invited talk on "Deficient Repair of Genomic Damage as a Basis for Neurodegenerative Diseases: *Role of Transition Metals and the RNA-binding Protein TDP-43*" at Wayne State University School of Medicine, Department of Biochemistry and Molecular Biology; Department of Neurology, on December 05, 2012.

**Dr. Sankar Mitra** visited Markey Cancer Center on Dec 11-12 at the University of Kentucky as an External Advisory Board member.

**Dr. Kay Choi** attended the AFRI/NRI Animal Health and Welfare Annual Project Director Meeting in Chicago.

## Graduate Program News

A big “thank you” to the BCSO for organizing the new student welcome event this year, and to the faculty that attended.

Congratulations to:

- ◆ **Natasha Brooks** (BMB) for a successful final defense.
- ◆ **Pawel Bujalowski** for being admitted to candidacy.
- ◆ **Aaron Brown** for being selected as the recipient of the Houston Area Molecular Biophysics Predoctoral Training Program.

*Congratulations to the following students for their achievements and recognition*

<b>Levani Zandarashvili:</b>	James E. Beall II Memorial Scholarship Marianne Blum, Ph.D. Endowed Scholarship Irma Mendoza Scholarship
<b>Kimberlee Burckart:</b>	Biological Chemistry Student Organization Award Jane Welsh Award for Excellence in Cardiovascular Research
<b>Abhijnan Chattopadhyay:</b>	Biological Chemistry Student Organization Award
<b>Alexandre Esadze:</b>	Barbara Bowman Memorial Award for Research Excellence Edith and Robert Zinn Presidential Scholarship
<b>Paige Spencer:</b>	Barbara Bowman Memorial Award for Research Excellence Arthur V. Simmang Scholarship Fund Ralph and Mary John Spence Centennial Scholarship Robert A. Welch Award for Excellence in Graduate Research in Chemistry
<b>Christof Straub:</b>	Dennis Bowman Memorial Scholarship
<b>Wenzhe Lu:</b>	Mason Guest Scholar Award UTMB Retirees Scholarship Award
<b>Justin Drake:</b>	University Federal Credit Union Scholarship
<b>Hung Doan:</b>	Rose and Harry Walk Research Award

*And*

UTMB Alumnus and Postdoctoral Fellow Michal Szymanski, Ph.D.: Jeane B. Kempner Scholar Award

**Dr. Cheryl S. Watson, Professor, BMB and Associate Director of the UTMB NIH-funded Toxicology Training Program** has agreed to serve as Editor-in-Chief of *Endocrine Disruptors*, the first multi-disciplinary, international, peer-reviewed journal to focus on the many aspects of how endocrine-active contaminants dupe the hormonal signaling system into inappropriate communication, and how we can intervene. The goal of the journal is to present top-notch and thought-provoking papers that will provide a better understanding of how these environmental contaminants operate, leading to solutions to address the hazards that they pose to humans, wildlife, and the environment. Topics to be covered in multiple types of manuscripts and educational pieces include:

Signaling mechanisms - endocrine disruption by chemicals that mimic/antagonize all classes of hormones: reproductive and metabolic hormones, morphogens, detoxification systems, vitamins, and orphans—via all hormone-binding proteins and metabolic pathways.

Endocrine disruption-based disease - e.g. reproductive, developmental, immunologic, metabolic, behavioral, oncologic—including both preclinical and epidemiologic studies.

High throughput, structure-based, and modeling methodologies - in silico compound docking, medium→high throughput screening methods, structure-activity studies, and database approaches. The study of mixtures, low-doses, non-monotonic dose behavior, and their environmental relevancy.

Experimental models - the suitability of cell and animal models for assessing endocrine disruptor activities.

Perinatal origins of adult disease – the fetal, postnatal and multigenerational basis of adult disease, and emerging examples of epigenetic control and endocrine disruptor-mediated imprinting of changes in gene expression.

Natural endocrine disruptors – e.g. phyto-hormones, phyco-hormones— and their disease, drug interaction, or therapeutic targets.

Cross-training for chemists and biologists— facilitating the interface of green chemistry design/remediation with endocrinology, aimed at eliminating future endocrine-disrupting chemicals from consumer products.

Public policy and education - the crafting of public policy to prevent and remediate endocrine disruption; community outreach, public education, translation to stake-holders, and web sites devoted to exposing or solving the endocrine disruption problem.

*Endocrine Disruptors* will be published online as each peer-reviewed article is accepted and formatted. The publisher, [Landes Bioscience](#), currently publishes a series of other journals of this type (e.g. [Epigenetics](#), [Cancer Biology & Therapy](#), [Adipocyte](#), [Oncoimmunology](#), [Cell Cycle...etc.](#)). An *alternative revenue-generating feature will be available as soon as possible*: supplying links to specific products directly from the Materials and Methods sections of papers, as both a convenience to readers seeking to replicate or extend the work, and as an alternative form of advertising for reagent and equipment vendors. Scientists will want to have efficient access to products that have been successfully used by their colleagues, companies should want to bring direct recognition and access to these products, and this mechanism will eventually establish a cost recovery for each commercial link accessed, to offset author charges.

Please visit the [Endocrine Disruptors](#) website to get more information about this journal, which will fill a special niche in the toxicology and “green” scientific and lay communities.

## BCSO News

<b>Chair</b>	Barb Rolls
<b>Vice-Chair</b>	Arijit Dutta
<b>Treasurer</b>	Alex Esadze
<b>Secretary</b>	Paul Bujalowski
<b>Webmaster</b>	Rahul Pal
<b>Faculty Advisor</b>	Marc Morais
<b>Mascot</b>	Para (Pary) Formaldehyde



The BCSO has had a very busy semester. We started out by hosting the “A Nobel Night” TGIT on October 4<sup>th</sup> for all the UTMB students. The event had a Nobel Prize theme with Italian food (Alfred Nobel spent his last years in Italy), Nobel Prize trivia and a contest to see who could guess the winners for 2012 (the maximum number correct was 1). It was a great opportunity to promote the BCSO and the Biochemistry & Molecular Biology Department.

### “A Nobel Night” TGIT



Also in October was the BMB Student-Faculty Mixer which followed the BMB seminar on October 18<sup>th</sup>. This was a great opportunity for the faculty to meet the new BMB students. October was an incredibly busy month! The BCSO sponsored the “Spooky Ring Toss” booth at the Osler Society Halloween Carnival on October 26<sup>th</sup>. This is an annual event to provide children from the hospitals and the local Galveston community with a safe way to celebrate the holiday. Thanks to our generous donors, the BCSO members were able to give away candy and hundreds of glow-in-the-dark necklaces. It was so successful that we have decided to hire someone to activate the necklaces next year!

## BCSO News (cont.)

### Halloween Carnival “Spooky Ring Toss”

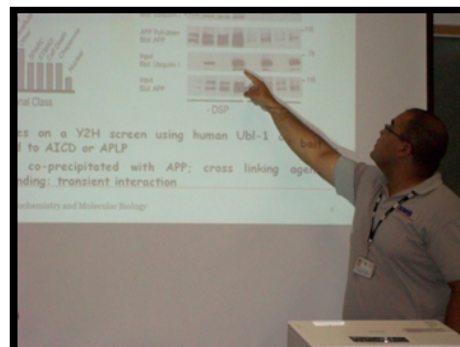


In November/December the BCSO collected donations for the annual Holiday Toy Drive. The generous contributions allowed us to brighten the holidays for seven children from the local Galveston area. We wrapped up the year by having a special holiday lunch at our monthly BCSO Meeting.

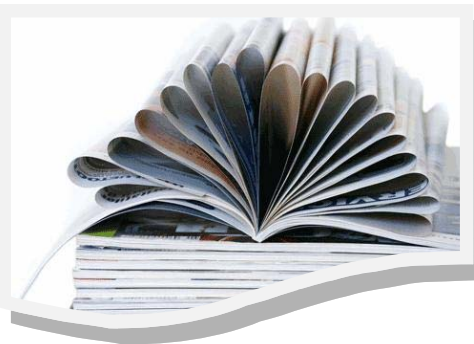
### BCSO Holiday Lunch



The Journal Club was a great success this semester! We had 11 student presentations and great discussions. We are looking forward to an equally successful spring semester. Thank you to all those who presented and to Dr. Montgomery Pettitt and the Sealy Center for Structural Biology and Molecular Biophysics for the generous support.



## Publications



**Mark A. White**, Sheng Li, Tamara Tsalkova, Fang C. Mei, Tong Liu, Virgil L. Woods Jr., and Xiaodong Cheng "Structural analyses of a constitutively active mutant of exchange protein directly activated by cAMP", , PLoS One. 2012;7(11). PMID: 23189173.

Saha M, **Morais MC**. FOLD-EM: automated fold recognition in medium- and low-resolution (4-15 Å) electron density maps. *Bioinformatics*. 2012 Dec 1;28(24):3265-73. doi: 10.1093/bioinformatics/bts616. Epub 2012 Nov 6.

Harshica Fernando, **John E. Wiktorowicz**, **Kizhake V. Soman**, Bhupendra S. Kaphalia, M. Firoze Khan and G. A. Shakeel Ansari, Liver proteomics in progressive alcoholic steatosis, *Toxicology and Applied Pharmacology*, (2012), <http://dx.doi.org/10.1016/j.taap.2012.11.017>

Bacsi A, Aguilera-Aguirre L, **Szczesny B**, Radak Z, **Hazra TK**, Sur S, Ba X and Boldogh I. (2012) Down-regulation of 8-oxoguanine DNA glycosylase 1 expression in the airway epithelium ameliorates allergic lung inflammation. *DNA Repair (in press)* PMID: 23127499

Larry A Denner, Jennifer Rodriguez-Rivera, Jordan B Jahrling, **J Russ Carmical**, Sigmund J Haidacher, **Rovshan Sadygov**, Jonathan M. Starkey, Heidi Spratt, **Bruce A Luxon**, **Thomas G Wood**, Kelly T Dineley, "Cognitive Enhancement with Rosiglitazone Links the Hippocampal PPAR $\gamma$  and ERK MAPK Signaling Pathways", 2012 *J Neurosci* Nov 21 32(47):16725–16735

Lau D, Lemon S, **Luxon BA**, Sinha M, Gale M, "Innate Immune Tolerance and the Role of Kupffer Cells in the Differential Response to Interferon Therapy in HCV Genotype 1 Patients.", 2012 *Gastroenterology* Nov 1. pii: S0016-5085(12)01602-2. doi: 10.1053

Andrew Douglas Haddow, Ph.D.; Hilda Guzman; Vsevolod L Popov; **Thomas G Wood**; **Steven G Widen**; Alastair D Haddow; Robert B Tesh; Scott C Weaver, First isolation of Aedes flavivirus in the Western Hemisphere and evidence of vertical transmission in the mosquito Aedes (Stegomyia) albopictus (Diptera: Culicidae). VIRO-12-373R1 Accepted

Power, T.D., Ivanciuc, O. Schein, C.H. and **Braun, W**. Assessment of 3D models for allergen research. *PROTEINS: Struct. Funct. and Bioinf.*, (in press), 2013.

**Hegde ML**, Hegde PM, Dutta A, Boldogh I and **Mitra S**. Human DNA Glycosylase NEIL1's interactions with downstream repair proteins is critical for efficient repair of oxidized genome damage and enhanced cell survival. *Biomolecules*, 2, 564-578, 2002.

## Featured Abstract by BMB Faculty

# Cognitive Enhancement with Rosiglitazone Links the Hippocampal PPAR $\gamma$ and ERK MAPK Signaling Pathways.

[J Neurosci](#). 2012 Nov 21;32(47):16725-35. doi: 10.1523/JNEUROSCI.2153-12.2012.

Denner LA, Rodriguez-Rivera J, Haidacher SJ, Jahrling JB, Carmical JR, Hernandez CM, Zhao Y, Sadygov RG, Starkey JM, Spratt H, Luxon BA, Wood TG, Dineley KT.

We previously reported that the peroxisome proliferator-activated receptor  $\gamma$  (PPAR $\gamma$ ) agonist rosiglitazone (RSG) improved hippocampus-dependent cognition in the Alzheimer's disease (AD) mouse model, Tg2576. RSG had no effect on wild-type littermate cognitive performance. Since extracellular signal-regulated protein kinase mitogen-activated protein kinase (ERK MAPK) is required for many forms of learning and memory that are affected in AD, and since both PPAR $\gamma$  and ERK MAPK are key mediators of insulin signaling, the current study tested the hypothesis that RSG-mediated cognitive improvement induces a hippocampal PPAR $\gamma$  pattern of gene and protein expression that converges with the ERK MAPK signaling axis in Tg2576 AD mice. In the hippocampal PPAR $\gamma$  transcriptome, we found significant overlap between peroxisome proliferator response element-containing PPAR $\gamma$  target genes and ERK-regulated, cAMP response element-containing target genes. Within the Tg2576 dentate gyrus proteome, RSG induced proteins with structural, energy, biosynthesis and plasticity functions. Several of these proteins are known to be important for cognitive function and are also regulated by ERK MAPK. In addition, we found the RSG-mediated augmentation of PPAR $\gamma$  and ERK2 activity during Tg2576 cognitive enhancement was reversed when hippocampal PPAR $\gamma$  was pharmacologically antagonized, revealing a coordinate relationship between PPAR $\gamma$  transcriptional competency and phosphorylated ERK that is reciprocally affected in response to chronic activation, compared with acute inhibition, of PPAR $\gamma$ . We conclude that the hippocampal transcriptome and proteome induced by cognitive enhancement with RSG harnesses a dysregulated ERK MAPK signal transduction pathway to overcome AD-like cognitive deficits in Tg2576 mice. Thus, PPAR $\gamma$  represents a signaling system that is not crucial for normal cognition yet can intercede to restore neural networks compromised by AD.