

ENVIRONMENTAL HEALTH SCIENCES

Newsletter



We are pleased to welcome Dzigbodi Doke, a Fulbright scholar from Ghana, to our department. She has come to us with a background in Environmental Science from the University of Ghana and is interested in pursuing research on environmental health issues in Ghana such as indoor air pollution related to traditional biomass use and research in support of policy development to safeguard public health as Ghana develops deep water oil production.

We also welcome the new members of Dr. Bailey's lab:

Dr. Zhengkuan Mao, M.D., Ph.D. - background in neuroscience and signal transduction – currently working on H₂S-mediated effects on signal transduction in heart and liver.

Dr. Angela M. Betancourt, D.V.M., Ph.D. -background in breast cancer and bisphenol A; proteomics – currently working on mitochondrial mechanisms of fatty liver disease.

PRESENTATIONS



Dr. Hasina Akhter, one of Dr. Liu's postdoctoral fellows, won the abstract competition award (4 winners out of 40-50 abstracts) and presented her work at the UAB Center for Aging annual meeting in October 2010.

Dr. Akhter presenting at the UAB Center for Aging.



Dr. Claudiu Lungu participated at the 8th International Scientific Conference of the International Occupational Hygiene Association held in Rome, Italy in September 2010. He presented a poster coauthored by the doctoral students Jo Anne Balanay and Shaun Crawford entitled: Testing Activated Carbon Fibers for Respiratory Protection.

Dr. Lungu in front of his poster at the 8th International Scientific Conference of the International Occupational Hygiene Association held in Rome, Italy



Shaun Crawford, CIH and Doctoral Candidate working with Dr. Claudiu Lungu in the Department of Environmental Health Sciences presented his research on styrene emissions from thermoset composite materials in the student poster competition at the Society of Plastics Engineers' Automotive Composites Conference and Exhibition in Detroit, Michigan. Shaun placed 2nd overall in the poster competition.

Doctoral candidate Shaun Crawford, won the 2nd place at student poster competition at the Plastics Engineers' Automotive Composites Conference and Exhibition in Detroit, Michigan.

Dr. Giuseppe Squadrito presented the poster "Bridging health effects of chlorine exposures and therapy with chemistry: toward a mechanism-oriented therapy for chlorine exposures" that he co-authored with Drs. Postlethwait and Matalon at the 240th American Chemical Society Meeting in Boston, MA in August.

Katherine Tuggle, mentored by Dr. Michelle Fanucchi, presented the poster "Early Life Exposure to Ozone Alters Airway Epithelial Responses in Wild-Type and Cystic Fibrosis Transmembrane Receptor (CFTR) Knockout Mice" at the 24th Annual North American Cystic Fibrosis Conference in Baltimore, MD in October.

Publications

K.K. Andringa, AL King, HB Eccleston, SK Mantena, A Landar, NC Jhala, DA Dickinson, G.L. Squadrito, SM Bailey. Analysis of the liver mitochondrial proteome in response to ethanol and S-adenosylmethionine treatments: novel molecular targets of disease and hepatoprotection. *Am J Physiol Gastrointest Liver Physiol.* 298:G732-45, 2010. (PMCID2867419)

G.L. Squadrito, EM Postlethwait, S Matalon, Elucidating Mechanisms of Chlorine Toxicity: Reaction Kinetics, Thermodynamics, and Physiological Implications. *Am J Physiol Lung Cell Mol Physiol.* 299(3):L289-300, 2010. (PC MID: PMC2951076)

YS Cheng, L Bowen, RJ Rando, EM Postlethwait, GL Squadrito, S Matalon Exposing Animals to Oxidant Gases: Nose Only vs. Whole Body *Proc Am Thorac Soc* 7: 264-268, 2010. PMID: 20601630 (PMCID in progress)

AK Yadav, A Bracher, SF Doran, M Leustik, GL Squadrito, EM Postlethwait, S Matalon Mechanisms and Modification of Chlorine-induced Lung Injury in Animals *Proc Am Thorac Soc* 7: 278-283, 2010. PMID: 20601632 (PMCID in progress)

W Song, S Wei, Y Zhou, A Lazrak, G Liu, JD Londino, GL Squadrito, S Matalon Inhibition of Lung Fluid Clearance and Epithelial Na⁺ Channels by Chlorine, Hypochlorous Acid, and Chloramines *J. Biol. Chem.* 285: 9716-9728, 2010. (PC MID20106988)

T Lee, M Harper, JE Slaven, K Lee, RJ Rando, EH Maples Wood Dust Sampling: Field Evaluation of Personal Samplers When Large Particles Are Present, *Ann. Occup. Hyg.*, 1–12, 2010, published on line.

King, AL and Bailey SM. Assessment of Mitochondrial Dysfunction Arising from Treatment with Hepatotoxicants, *Curr Prot Toxicol* 44:14.8.1-14.8.29 (2010).

King AL, Swain TM, Dickinson DA, Lesort MJ, and Bailey SM. Chronic ethanol consumption enhances sensitivity to Ca²⁺-mediated opening of the mitochondrial permeability transition pore and increases cyclophilin D in liver. *Am J Physiol Gastrointest Liver Physiol* 299(4):G954-966 (2010). (PMC Journal - In Process)

Hill BG, Dranka BP, Bailey SM, Lancaster, JR, and Darley-Usmar VM. What part of NO don't you understand? Some answers to the cardinal questions in nitric oxide biology. *J Biol Chem* 285(26):19699-19704 (2010).

New Grants

Hepatocyte clock and alcoholic fatty liver injury

Principal Investigator: Shannon M. Bailey

Agency: NIH/NIAAA
08/31/12

Type: 1 R21 AA020199

Period: 09/20/10-

The goal of this project is to investigate whether chronic ethanol-induced steatosis and liver dysfunction are due, in part, to circadian desynchrony between the central (SCN) clock and the peripheral liver (hepatocyte) clock. The objective of this new R21 application is to investigate whether alcohol-dependent alterations in circadian clocks contribute to alcoholic fatty liver disease. This project was funded under RFA, AA-10-008, "Gut-Liver-Brain Interactions in Alcohol-Induced Pathogenesis". One focus area of this RFA is to investigate how disrupted circadian rhythms or clocks contribute to alcohol-induced liver injury. In this project we plan to determine whether circadian desynchrony between the suprachiasmatic nucleus (i.e., SCN) and the liver (i.e., hepatocyte) plays a significant role in alcohol-induced liver injury. Similarly, we hypothesize that the hepatocyte circadian clock directly regulates liver triglyceride metabolism with alcohol-mediated disruption of the hepatocyte clock contributing to alcoholic steatosis. This project capitalizes on the expertise of an interdisciplinary investigative team comprised of Dr. Shannon M. Bailey, UAB-Environmental Health Sciences, Dr. Martin E. Young, UAB-Medicine, and Dr. Karen L. Gamble, UAB- Psychiatry - Behavioral Neurobiology to answer the question of how alcohol-dependent dysregulation of circadian clocks in liver and brain impacts alcoholic liver injury.

Student Theses and Dissertation Defenses



Adrienne L. King, under the mentorship of Dr. Shannon M. Bailey, successfully defended her thesis entitled “Chronic Alcohol Consumption Promotes Opening of the Mitochondrial Permeability Transition Pore and Increases Mitochondrial Injury in Liver”. The body of work provided insight on what effects chronic alcohol consumption has on liver mitochondrial dysfunction with an emphasis on the mitochondrial permeability transition pore (MPTP). The focus of the project was on the mitochondrion which is a specific target of ethanol toxicity and much of the damage can be related to

unregulated Ca^{2+} homeostasis and oxidative stress which are key players in the induction of the mitochondrial permeability transition pore (MPTP) within the organelle. The mechanism behind the induction of the MPTP remains elusive and the project provided a more comprehensive understanding of the molecular events that contribute to chronic ethanol-induced mitochondrial dysfunction and damage.

Adrienne is now a post-doctoral fellow at Emory University in Atlanta, GA. She will be working with Dr. David Lefer in the Department of Cardiothoracic Surgery where she will continue her interest in mitochondrial biology in the cardiovascular system. In addition, she was awarded the Fellow in Research and Science Teaching (FIRST) fellowship. This is a 3 year fellowship which will allow her to not only continue high quality research but, also gain teaching experience.



Amit K. Yadav, under the mentorship of Dr. Sadis Matalon, successfully defended his thesis entitled "Therapeutic Interventions for Chlorine gas induced Lung Injury". The project looked at the beneficial effects of Nitrite on Acute epithelial lung injury following Chlorine gas exposure. The Nitrite showed some protective effects on lung injury probably by converting into Nitric Oxide (NO). The study was mainly based on the cytoprotective and anti inflammatory effects of the Nitrite anion seen in hypoxic and acidic conditions in various other organ systems such as the liver and the heart. The experiments did show some cytoprotection in the lungs but anti inflammatory effects were not seen. The molecular mechanism leading to the effects shown by the Nitrite still remain to be assessed. The study

provided some evidence for the potential use of Nitrite as a novel therapeutic agent in inhaled oxidant injury to the lungs.

On The Gulf Oil Spill Front

Drs. Gohlke and Lungu are conducting research related to the recent Deepwater Horizon oil spill in the Gulf of Mexico.

Dr. Gohlke received funding through the UAB Gulf Oil Response Pilot Project to develop novel risk assessment methods for Gulf seafood based on population specific exposure scenarios and incorporation of dispersant and heavy metal toxicity parameters. She has also received funding to develop a white paper reviewing the current knowledge on the safety of gulf seafood and providing recommendations for supplemental testing in finfish. Dr. Gohlke is working with Dr. Nalini Sathiakumar's group in the Epidemiology Department and Dzigbodi Doko, a doctoral student in the Env. Health Sciences Department.

Dr. Claudiu Lungu received funding through the UAB Gulf Oil Response Pilot Project to collect preliminary data for developing a new method for environmental sampling and exposure assessment. In this project: "Method Development for the Use of Dispersant as Leading Indicator of Oil Contamination and Exposure following the Gulf Oil Spill" he is working with Evan Floyd, a doctoral student and Jonghwa Oh, a master student in the Env. Health Sciences department.

Contacts

Phone: 205.934.8488

Fax: 205.975.6341

ehs@uab.edu

1665 University Boulevard
Birmingham, AL 35294-0022

www.soph.uab.edu/ehs

Link to The Deep South Center Newsletter

<http://www.soph.uab.edu/dsc/system/files/2/November%202010.pdf>