Greetings WHRC members!

Well, General Beauregard Lee, the Georgia groundhog, has predicted an early Spring, but Punxsutawney Phil says, “No way!” So let’s hope Beau is right!

We have an exciting Spring coming up with our Seminar series. If you would like to present your work to interest new collaborators, please contact us.

The save the date for the Fifth Joint APS-WHRC research conference, entitled: “Metabolic, Cardiovascular and Renal Disease: Physiology and Gender”. The conference will be held at the Sheraton Hotel in Annapolis, MD, November 17-20, 2015. The deadlines for abstract submission, registration, etc. are on the back page of the newsletter. You will recall that we had the 4th conference here at UMMC in 2011. Since we had such a great turnout for that conference, we will have travel grants for UMMC junior investigators and trainees to attend the meeting.

Have a productive Spring!

Janie

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**From the Director**

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**WHRC Seminar**

If you would like to give a presentation of your research to the members of the WHRC, please contact Babbette LaMarca at bblamarca@umc.edu.

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**Our Mission:** Women have health care issues that are different from men. Recent research indicates that there are sex differences in the incidence, outcome, and physiological and pathophysiological mechanisms responsible for various diseases. Mississippi has the dubious honor of having one of the highest incidence rates of cardiovascular disease, obesity, diabetes, hypertension, end-stage renal disease, high risk pregnancy, pre-eclampsia (pregnancy induced hypertension), infant mortality and poor child health outcomes in the United States. The Women’s Health Research Center (WHRC) was established in 2009 at the University of Mississippi Medical Center (UMMC) to accomplish the major goal of fostering excellence in basic and clinical research in issues that affect women’s health across their lifespan.
Go Red for Women

WHRC asks our members to show their support by wearing Red Friday, Feb 6, 2015

Picture to be made on steps in front of G 351 at 10:15!
Dr. Barbara T. Alexander is a Professor of Physiology and Director of the Analytical and Assay Core and the Director of Basic Research for the newly established Center for Excellence in Development Disorders Research (CEDDR). Her research is funded by the National Heart, Lung and Blood Institute (NHLBI) and the American Heart Association. Dr. Alexander obtained her Ph.D. in Biochemistry in 1997, performed her postgraduate training in Physiology where she became Assistant Professor in 2002. Dr. Alexander is the author of many abstracts, publications and book chapters, has been continuously funded since 1999, and is currently either PI, core director or co-investigator on 6 extramurally funded research grants. Dr. Alexander's research focus is on how low birth weight or failure to achieve full growth potential during fetal life could program hypertension and increased cardiovascular risk in adulthood. In addition, she studies sex differences in the developmental programming of adult disease, and how age impacts programmed risk.

She is a member of the Hypertension and Microcirculatory Study Section of the NIH and is a former Chair of the CardioRenal Study Section for the American Heart Association. Dr. Alexander is a long-time member of American Physiological Society (APS). She is currently serving a 3 year term as a Councillor for the APS, and recently completed her term as the Secretary/Treasurer for the Water & Electrolyte Homeostasis Section of the APS. She has also served on the Women in Physiology and the Communication Committees for the APS. Dr. Alexander is also a long-time member and Fellow of the Hypertension Council of the American Heart Association where she currently serves as Chair of the Membership Committee and is member of the Leadership Council. She is the former editor of the Hypertension Council Connections Newsletter and she is a member of numerous editorial boards including Hypertension, the American Journal of Physiology, Regulatory, Integrative and Comparative Physiology, the American Journal of Physiology, Renal Physiology and the American Journal of Physiology, Heart and Circulatory Physiology.

Dr. Alexander's commitment to achieving excellence at UMMC is epitomized by her service on numerous institutional committees. She has received many awards for her research including the Arthur C. Guyton New Investigator Award from the Consortium for Southeastern Hypertension Control (COSEHC), the New Investigator Award from the Water and Electrolyte Section of the American Society of Physiology, the American Society of Hypertension/Monarch Pharmaceuticals Young Scholar Award, and the Merck New Investigator Award for Excellence in High Blood Pressure Research from the American Heart Association. She is a faculty member of the UMMC chapter of Alpha Omega Alpha and is a recipient of the Gold Level Excellence in Research Award from UMMC.

The WHRC is proud to have Dr. Barbara T. Alexander as an active member!
Suttira Intapad, Ph.D., Instructor in the Department of Physiology & Biophysics was awarded a COBRE pilot project title "Reduced Uterine Perfusion in the Mouse: Developmental Programming of Cardiovascular and Metabolic Disease".

In addition, Dr. Intapad was awarded Best Postdoctoral Poster Presentation Award, at Research Day sponsored by the School of Health Related Science, UMMC in Oct, 2014.

Furthermore, Dr. Intapad was selected as one of the awardees of the Caroline tum Suden/Frances Hellebrandt Professional Opportunity Award which she will receive in Boston at the 2015 Experimental Biology Meeting.

Keep up the excellent work Dr. Intapad!

Denise Cornelius, Ph.D., Postdoctoral fellow in Pharmacology & Toxicology in the LaMarca Laboratory was awarded an NIH NRSA titled “Hypertension, the Kidney, and Inflammation”. Her funding began December 2014.

In addition, Dr. Cornelius received the APS Physiologists in Industry Committee Postdoctoral Novel Disease Model Award for her abstract titled “Placental Ischemia-induced T_{H}17 cells Mediate the Pathophysiology Associated with Preeclampsia.” She will receive her award in Boston at the 2015 Experimental Biology Meeting.

Congratulations Dr. Cornelius!
Andrew Brown, a 3rd year Medical student and an MSRP student in the laboratory of Dr. Barbara Alexander was awarded APS 2015 Excellence in Professional Student (MD or DO) Research Travel Award to attend 2015 Experimental Biology in Boston.

Lorena Amaral, Ph.D., Congratulations for being awarded the International Society for the Study of Hypertension in Pregnancy President Award: The Most Outstanding Basic Science Oral Presentation in Relation to the Study of Hypertension in Pregnancy in New Orleans in October, 2014. Her abstract is entitled “17-hydroxyprogesterone caproate attenuates hypertension and uterine artery resistance in response to Reduced Uterine Perfusion Pressure (RUPP) in pregnant rats”.

In addition, Dr Amaral was selected as one of the awardees of the Caroline tum Suden/ Frances Hellebrandt Professional Opportunity Award which she will receive in Boston at the 2015 Experimental Biology Meeting.

Women’s health issues are underfunded and understudied.
Help support women’s health research by making a tax-deductible contribution.
Contact the Development Office at UMMC at 601-815-7473
Ellen E. Gillis, mentored by Jenny Sasser in the Department of Pharmacology, was selected by the Water and Electrolyte Homeostasis Section as a Predoctoral Research Recognition Award finalist to present her research at the 2015 Experimental Biology meeting in Boston.

John Henry Dassinger, mentored by Barbara Alexander in the Department of Physiology, was selected by the Water and Electrolyte Homeostasis Section as a Predoctoral Research Recognition Award finalist to present his research at the 2015 Experimental Biology meeting in Boston.

Mark Cunningham, Ph.D., mentored by Babbette LaMarca in the Department of Pharmacology, was selected by the Water and Electrolyte Homeostasis Section as a finalist in the Juan Carlos Romero Postdoctoral Research Recognition Award and will present his research at the 2015 Experimental Biology meeting in Boston.

Abnormal cortical circuitry and function as well as distortions in the modulatory neurological processes controlling cortical plasticity have been argued to underlie the origin of autism. In this study these authors distorted those processes with antidepressant drug-exposure to cause distortions like those expressed in autism. They found that young treated rats that displayed impaired neuronal repetition-rate. While focused on recovering grossly degraded auditory system processing in this model, they demonstrated that targeted temporal processing deficits induced by early-life antidepressant exposure were almost completely reversed with simple behavioral training strategy (i.e., a modified go/no-go repetition-rate discrimination task). Degraded parvalbumin inhibitory GABAergic neurons and the fast inhibitory actions that they control were normalized by training. Importantly, antidepressant-induced degradation of serotonergic and dopaminergic neuromodulatory systems regulating cortical neuroplasticity was sharply reversed. These findings bear important implications for neuroplasticity-based therapeutics in autistic patients.
Reed DK, Hall S, Arany I. Alpha-tocopherol protects renal cells from nicotine- or oleic acid-provoked oxidative stress via inducing heme oxygenase-1 J Physiol Biochem, [Epub ahead of print] 2014: PMID 25471815

In this study the authors demonstrate that pre- or post-treatment of renal proximal tubule cells with alpha-tocopherol (TOC) attenuates nicotine (NIC)- or oleic acid (OA)-dependent ROS production in an HO-1-dependent manner. They showed that TOC induces the HO-1 promoter via extracellular signal-regulated kinase (ERK)- and protein kinase A (PKA)-mediated activation of the cAMP-response element (CRE). Hence, vitamin E supplementation –via induction of the cytoprotective HO-1- may help to reduce renal oxidative stress imposed by smoking or obesity.


This study investigated the effects of dual delivery of statin and vancomycin on angiogenesis during the healing process of a femoral defect injury using tricalcium phosphate lysine (TCPL) delivery system in an animal model. Rats were surgically induced with femoral defect (2 mm, midshaft of the right femur) and implanted (IM) with TCPL capsules loaded with vancomycin (20mg) (TCPL-AB) or TCPL capsules loaded vancomycin (20 mg) plus statin (5 mg). The results of this study indicated that statin plus vancomycin treated animals had increased angiogenetic activities with many blood vessels compared to the sham group and the animals also healed in a greater magnitude than the sham group (independent evaluators (p<0.001)). Histomorphometric analysis demonstrated that exposure to sustained delivery of statin resulted in increased blood vessel formation thereby indicating that overall having a sustained delivery of statin by TCPL resulted in a remarkable increase in angiogenic and osteogenic activities during the healing process of a femoral defect.

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Obesity and aging are prominent risk factors for myocardial infarction (MI) but how obesity interacts with aging to alter post-MI response is unclear. These authors tested the hypothesis that obesity in aging mice would impair the resolution of post-MI inflammation. Polyunsaturated fatty acids (PUFA diet) PUFA feeding to 12 months-old C57BL/6J mice for 5 months showed higher fat mass compared to standard lab chow (LC) fed young (LC young; 3-5 months-old) or aging alone control mice (LC aging). LC young, LC aging and PUFA aging mice were subjected to coronary artery ligation to induce MI. Despite similar infarct areas post-MI, plasma proteomic profiling revealed higher vascular cell adhesion molecule-1 in PUFA aging compared to LC young and LC aging, leading to increased neutrophil infiltration and other markers of inflammation in the PUFA aging group (p<0.05). These authors conclude that PUFA aging magnifies post-MI inflammatory response and impairs healing response by stimulating prolonged neutrophil trafficking and pro-inflammatory lipid mediators.


Recent findings suggest the therapeutic action of relaxin during hypertension is dependent on nitric oxide synthase (NOS) activation; however, the mechanisms underlying the beneficial effects of relaxin on the NOS system have not been elucidated. The authors hypothesized that the protective effects of relaxin include reducing both oxidative stress and the endogenous NOS inhibitor asymmetric dimethylarginine (ADMA). We examined the effect of Serelaxin [human recombinant relaxin-2 (RLX)] in male Sprague-Dawley rats given high-dose angiotensin (ANG) II for 6 wk. While RLX had no effect on sham rats, RLX attenuated the ANG II-dependent hypertension and proteinuria and normalized oxidative stress and circulating ADMA, in association with restored NOx excretion and kidney cortex NOx. They found that RLX had no impact on the ADMA-regulatory enzymes protein arginine methyltransferase and dimethylarginine-dimethylaminohydrolase (DDAH) or DDAH activity in kidney cortex or liver. These data suggest that benefits of RLX treatment include reduced ADMA levels and increased NO bioavailability, possibly due to its antioxidant effects.
SAV E THE DATE!
The Fifth International Conference on Sex and Gender
Sponsored by the American Physiological Society and
the Women’s Health Research Center
Metabolic, Cardiovascular, and Renal Disease: Physiology &
Gender

Annapolis Sheraton, November 17-20, 2015

Abstract deadline: June 26, 2015
Travel award deadline: July 8, 2015
Registration deadline: October 16, 2015
Hotel registration deadline: October 18, 2015