Greetings WHRC members

Happy Spring! The flowers are blooming, and so are we in the WHRC. We have a lot of plans for these next few months. We plan to submit a T32 grant to National Institutes of Health to help support postdoctoral funding for our clinicians and scientists. We are continuing our seminar series. Our next speaker will be a new faculty member, Dr. Jennifer Sasser, from Pharmacology, on April 9. We also will have some outside of UMC speakers later this year. More news to come!

Thanks for your continued support of the WHRC—if you have time, “LIKE” us on Facebook! Also, we now have a link from our website to the UMC Development website where you can donate money for our various programs. Please take advantage of that—all contributions are tax deductible.

Janie

From the Director:

Jane F. Reckelhoff

WHRC Seminar

Dr. Jennifer Sasser

“Renal Phosphodiesterase-5 in the Maternal Volume Expansion of Normal Pregnancy”

4 pm, April 9th, Room 3A

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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.
Dr. Babbette LaMarca, PhD, was recently awarded an NIH grant to investigate the role of inflammatory mediators that cause hypertension during pregnancy. In her research Dr. LaMarca combines basic science research with clinical studies in order to investigate how inflammatory cells and their products cause renal and placental dysfunction which contributes to hypertension during preeclampsia, a condition of new onset hypertension during pregnancy. In addition, Dr. LaMarca has expanded previous research efforts in the department of Obstetrics & Gynecology examining a role for vasoactive and endothelial growth factors in contributing to the development of uterine leiomyoma (fibroids) in Mississippi women.

Dr. LaMarca conducted her graduate studies at the University of Mississippi Medical Center and completed her Ph.D. in 2004 from the Department of Microbiology and Immunology. She then joined the Department of Physiology at UMMC as a postdoctoral fellow in the laboratory of Dr. Joey P Granger. In 2005 Dr. LaMarca was awarded a National Research Service Award from the National Institutes of Health and in 2007 she began a joint appointment with the Department of OB/GYN whereby she began directing thesis research for the Fellowship program in the Division of Maternal Fetal Medicine. In July 2008 Dr. LaMarca was awarded a Scientist Development Grant from the American Heart Association and became an Assistant Professor with joint appointments in the Departments of Obstetrics and Gynecology and Physiology. Dr LaMarca was named the Director of Basic Science Research for the Department of OB/GYN in 2009 overseeing all bench research for OB/GYN fellows, residents and students and in 2011, Dr. LaMarca was promoted to Associate Professor. Dr. LaMarca is a member of the Institutional Biosafety Committee, the UMMC Graduate Faculty, the Internal Review Board of the Graduate Program in the School of Graduate Studies at UMMC, and serves on the Institutional Research Advisory Committee. She also serves as a mentor for the UMMC Base Pair program. She is the previous recipient of the Young Investigator Award from Inter-American Society of Hypertension and a previous finalist for the Trainee Award from the Water and Electrolyte Homeostasis Section of the American Physiological Society. Dr. LaMarca has received the Bronze Medal of Excellence in Research Award from University of Mississippi Medical Center.
If you are attending the annual Experimental Biology Meeting to be held in San Diego in April 2012, join Dr. Joey Granger, current president of the American Physiological Society and member of the WHRC, and other alumni from the UMMC School of Graduate Studies in the Health Sciences for an evening of fun, refreshments, and networking! Please RSVP to sjkelly@umc.edu if interested.
Dr. Jennifer Sasser, Ph.D., recently joined the Department of Pharmacology and Toxicology at UMMC in January 2012 as an Assistant Professor. Dr. Sasser is funded by a Scientist Development Grant from the American Heart Association for her project “Mechanisms of Renoprotection by Relaxin in Hypertension.” This project will study the effects of relaxin, a hormone that is increased in normal pregnancy, on blood pressure and renal injury. Because a loss of nitric oxide (NO) in chronic kidney disease contributes to cardiovascular risk and furthers progression of kidney damage, interventions that restore NO production are likely to reduce the cardiovascular complications of CKD as well as slow the rate of progression of renal injury. Relaxin causes vasodilation and increases renal blood flow via increased NO production and is also anti-fibrotic and may, therefore improve kidney structure in disease states. Dr. Sasser’s research will determine the molecular mechanisms of the renoprotective actions of relaxin in rodent models of hypertension and kidney disease, specifically focusing on the effects of relaxin on the renal endothelin – NO pathway.

Dr. Sasser recently was appointed the Chair of the American Physiological Society Trainee Advisory Committee and she was recently selected as the 2012 APS Water and Electrolyte Homeostasis Section New Investigator Awardee. She will receive her award and present a Lecture highlighting her research advances at the Spring Experimental Biology meeting to be held in April in San Diego, CA.

Dr. Damian Romero, Ph.D., an Assistant Professor in the Department of Biochemistry at UMMC is a recent recipient of a Scientist Development Grant from the American Heart Association for his project entitled, “Role of microRNA-21 in aldosterone-mediated cardiac injury.” This project will examine the complex molecular mechanisms underlying aldosterone excess-mediated cardiac injury and determine if exogenous up-regulation of cardiac miR-21, an endogenous, small, non-coding RNA that can down regulate the expression levels of specific proteins, may serve as a therapeutic approach to further mitigate or abolish aldosterone-excess mediated cardiac injury and dysfunction.
The 32nd annual meeting of the Society for Maternal-Fetal Medicine, entitled “The Pregnancy Meeting”, convened February 6-11, 2012 at the Hyatt Regency Dallas. Among the more than 1500 attendees were three of the Department of Maternal Fetal Medicine faculty and all five of their MFM fellows. Among the 838 abstracts and presentation from a host of national and international MFM centers were 9 abstracts from the University of Mississippi. Those recognized by first author abstract submission and presentations included the following fellows in the MFM fellowship program: Dr. Kiram B. Tam Tam, Dr. Sarah Anne Richards Novotny, Dr. Justin M. Brewer, Dr. Luissa V. Fisteag Kiprono, and Dr. Pushpinder Dhillon.

Nicole E. E. Benson, an undergraduate student mentored by Dr. Bettye Sue Hennington, Professor of Biology at Tougaloo College, recently received 1st Place in the 2011 Tougaloo College and Natural Science Summer Research Division sponsored Summer Research Symposium for undergraduate researchers. Ms. Benson also received 1st Place in the Undergraduate Cardiovascular Division at the 2011 Southeast Regional IDeA Meeting sponsored by NIH for institutions funded by INBRE and COBREs. In addition, she also received 1st Place in the Undergraduate Physiology Poster Division at the 2011 Annual Biomedical Research Conference for Minority Students sponsored by the American Society of Microbiology.
Dr. Keisha Mathis, PhD, an Instructor in Physiology in the laboratory of Dr. Michael J. Ryan and Dr. Sydney Murphy, PhD, a post-doctoral fellow in the Department of Pharmacology and Toxicology in the laboratory of Dr. Richard Roman, are finalists for the Juan Carolos Romero and Water & Electrolyte Homeostasis Section Postdoctoral Travel and Research Recognition Award. This travel award provides support for travel expenses for junior investigators to attend the 2012 Experimental Biology Meeting. Drs. Mathis and Murphy were first author on an abstract submitted to an APS Water & Electrolyte Homeostasis Section sponsored topic category at the EB meeting. They will present their work as an oral presentation at the WEH sponsored Trainee Session with recognition of the top Awardee to be announced at the annual WEH Business Luncheon.

Dr. Paula Warrington, PhD, and Dr. Ana Palei, PhD, post-doctoral fellows in the laboratory of Dr. Joey P. Granger in the Department of Physiology, and Dr. Keisha Mathis, PhD, an Instructor in the Department of Physiology in the laboratory of Dr. Michael J. Ryan, are recipients of an American Physiological Society/NIDDK Minority Travel Award. This award is designed to encourage highly qualified individuals from groups traditionally underrepresented in science to pursue professional careers in physiological & biomedical sciences. It will provide funds for travel to the Experimental Biology meeting in April 2012 in San Diego, CA and will pair each recipient with an APS mentor during the meeting.

Dr. Ana Palei, PhD, a post-doctoral fellow in the laboratory of Dr. Joey P. Granger in the Department of Physiology is a recipient of the Caroline tum Suden/Francis A. Hellebrandt Professional Opportunity Award, an abstract based award for graduate and postdoctoral fellows.

Fouad Zouien, a graduate student in the Department of Pharmacology and Toxicology in the laboratory of Dr. George Booz received a travel stipend from the American Heart Association Council on Peripheral Vascular Disease (PVD) to attend the PVD Fellow in Training Workshop at the 2011 Scientific Sessions in Orlando FL. This workshop provides an interdisciplinary core curriculum for trainees and junior faculty.
**In the News**

**Dr. Frank T. Spradley, PhD**, a post-doctoral fellow in the laboratory of Dr. Joey P. Granger in the Department of Physiology, is a finalist for the Water & Electrolyte Homeostasis Section Pre-doctoral Research Recognition Award for work performed during his graduate training at Georgia Health Sciences University. This award will provide support for his travel expenses for the 2012 Experimental Biology Meeting. **Dr. Spradley** is also a recipient of the Gabor Kaley Professional Opportunity Award, an abstract based award for Experimental Biology Meeting in 2012.

**Dr. Kedra Wallace, PhD**, an Instructor in the Department of OB/GYN and post-doctoral fellow in the laboratory of Dr. Babbette LaMarca is the recipient of the Steven M. Horvath Professional Opportunity Award from the American Physiological Society. This award is granted to the top two minority graduate students or postdoctoral fellows who present at paper at the 2012 Experimental Biology Meeting. **Dr. Wallace** also recently received a Ruth L. Kirschstein National Research Service Award (NRSA) for her research project entitled, “The role of T lymphocytes in mediating hypertension during pregnancy.” This funding opportunity is named for Dr. Kirschstein, the first woman director of the NIH who contributed significantly to the development of the polio vaccine and was a strong advocate for inclusion of underrepresented individuals in science. The purpose of the NRSA funding program is to ensure that highly trained scientists will be available in adequate numbers and in appropriate research areas to carry out the Nation’s biomedical, behavioral, and clinical research agenda.

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**Did you know?**

The American Physiological Society (APS) has announced a new policy requiring the reporting of the sex of experimental animals and the sex or gender of humans used in studies submitted for publication in any of the organization’s 13 peer-reviewed journals. This notable requirement for all research study authors has been approved by the APS leadership and will be presented in an editorial, “In Pursuit of Scientific Excellence – Sex Matters” written by Virginia Miller, Ph.D., Professor, Surgery and Physiology, Mayo Clinic in all APS journals beginning this month.
The WHRC recently celebrated National “Wear Red Day!” Go Red for women sponsored by the American Heart Association helps raise awareness of heart disease in women. Pictured are members of the Women’s Health Research Center at UMMC.

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 for more information.

Your help is greatly appreciated!

Placental hypoxia/ischemia has been implicated as a central factor in the development of preeclampsia. One particularly useful animal model to study the impact of placental ischemia is the reduced uterine perfusion pressure (RUPP) model. We have previously demonstrated that RUPP animals exhibit elevated placental oxidative stress, which plays an important role in the development of the associated maternal hypertension. Recently, we demonstrated that cobalt protoporphyrin (CoPP)-mediated induction of heme oxygenase-1 (HO-1) attenuates RUPP-induced oxidative stress and consequent hypertension. However, signaling pathways that are involved in this process are virtually unknown. This study demonstrates that placentas from RUPP animals exhibit increased phosphorylation of JNK, STAT1, STAT3, and p52shc with a concomitant increase in caspase-3 activation and depletion of intracellular ATP. These results demonstrate a novel therapeutic activity of HO-1 induction in placental cell survival during ischemia and support the HO-1 pathway as a promising therapeutic target for the management of preeclampsia.


Several lines of evidence suggest that essential hypertension originates from an autoimmune-mediated mechanism. One consequence of chronic immune activation is the generation of oxygen-derived free radicals, resulting in oxidative stress. Renal oxidative stress has direct prohypertensive actions on renal microvascular and tubular function. We showed previously that female NZBWF1 mice, an established model of the autoimmune disease systemic lupus erythematosus (SLE), develop hypertension associated with renal oxidative stress. The present study tested the hypothesis that oxidative stress contributes to autoimmune-mediated hypertension and data suggest that renal oxidative stress plays an important mechanistic role in the development of autoimmune-mediated hypertension.
Exposure to maternal overnutrition and a high fat diet during early postnatal development increases susceptibility to metabolic and renal injury later in life. Am J Physiol Regul Integr Comp Physiol. 2011;301(5):R1495-R1500.

Overnutrition during pre- and postnatal development confer increased susceptibility to renal and metabolic risks later in life; however, whether they have an additive effect on the severity of renal and metabolic injury remains unknown. The present study tested the hypothesis that a combination of a pre- and postnatal diet high in fat/fructose would exacerbate renal and metabolic injury in male offspring later in life. A combination of exposure to a high fat/fructose diet in utero and postnatally increased plasma insulin levels by 140% compared to normal fed offspring suggesting that combined exposure to overnutrition during fetal and early postnatal development potentiates susceptibility to metabolic disturbances later in life.

Primary aldosteronism is the most common cause of secondary hypertension, most frequently due to an aldosterone-producing adenoma or idiopathic hyperaldosteronism. Somatic mutations of the potassium channel KCNJ5 in the region of the selectivity filter have been found in a significant number of aldosterone-producing adenomas. There are familial forms of primary aldosteronism and in familial hyperaldosteronism type 3, there is a genomic mutation causing a T158A change of amino acids. These studies demonstrate that the T158A mutation of the KCNJ5 gene produces a marked stimulation in aldosterone biosynthesis that is dependent on membrane depolarization and sodium and calcium influx into the HAC15 adrenal cortical carcinoma cells.