

2011-2012
Summary of Scholarly Activities
Department of Physiology

I. PUBLISHED JOURNAL ARTICLES, BOOK CHAPTERS, AND PATENTS

Chettimada S, Rawat DW, Dey N, Kobelja R, Simms Z, Wolin M, Lincoln TM, Gupta SA. Glc-6-PD and PKG contribute to hypoxia-induced decrease in smooth muscle cell contractile phenotype proteins in pulmonary artery. *Am J Physiol Lung Cell Mol Physiol*. 2012 Jul;303(1):L64-74.

Darbera L, Chenoune M, Lidouren F, Ghaleh B, Cohen MV, Downey JM, Berdeaux A, Tissier R. Adenosine and opioid receptors do not trigger the cardioprotective effect of mild hypothermia. *J Cardiovasc Pharmacol Ther*. 2012 Jun;17(2):173-80.

Dey NB, Lincoln TM. Possible involvement of cyclic GMP-dependent protein kinase on matrix metalloproteinase-2 expression in rat aortic smooth muscle cells. *Mol Cell Biochem*. 2012 Sep;368(1-2):27-35.

Francis M, Qian X, Charbel C, LeDoux J, Taylor MS. Automated region of interest analysis of dynamic Ca^{2+} signals in image sequences. *Am J Physiol Cell Physiol*. 2012 Aug;303(3):C236-43.

Parker J. Acute lung injury and pulmonary vascular permeability: use of transgenic models. *Compr Physiol* Jan;2(1):835-82. Available from: <http://www.comprehensivephysiology.com/WileyCDA/CompPhysArticle/refId-c100013.html>

Rocic B, Znaor A, Rocic P, Weber D, Vucic Lovrencic M. Comparison of antihyperglycemia effects of creatine and glibenclamide in type II diabetic patients. *Wien Med Wochenschr*. 2011 Nov;161(21-22):519-23.

Skarra DV, Cornwell T, Solodushko V, Brown A, Taylor MS. CyPPA, a positive modulator of small-conductance Ca^{2+} -activated K^+ channels, inhibits phasic uterine contractions and delays preterm birth in mice. *Am J Physiol Cell Physiol*. 2011 Nov;301(5):C1027-35.

Taylor MS, Francis M, Qian X, Solodushko V. Dynamic Ca^{2+} signal modalities in the vascular endothelium. *Microcirculation*. 2012 Jul;19(5):423-9.

Tissier R, Ghaleh B, Cohen MV, Downey JM, Berdeaux A. Myocardial protection with mild hypothermia. *Cardiovasc Res*. 2012 May;94(2):217-25.

Torres RA, Drake DA, Solodushko V, Jadhav R, Smith E, Rocic P, Weber DS. Slingshot isoform-specific regulation of cofilin-mediated vascular smooth muscle cell migration and neointima formation. *Arterioscler Thromb Vasc Biol*. 2011 Nov;31(11):2424-31.

Townsley MI. Structure and composition of pulmonary arteries, capillaries, and veins. *Compr Physiol*. 2012 Jan;2(1):675-709. Available from: <http://www.comprehensivephysiology.com/WileyCDA/CompPhysArticle/refId-c100081.html>

Tran CH, Taylor MS, Plane F, Nagaraja S, Tsoukias NM, Solodushko V, Vigmond EJ, Furstenhaupt T, Brigdan M, Welsh DG. Endothelial Ca²⁺ wavelets and the induction of myoendothelial feedback. *Am J Physiol Cell Physiol*. 2012 Apr;302(8):C1226-42.

Welsh DG, Taylor MS. Cell-cell communication in the resistance vasculature: the past, present and future. *Microcirculation*. 2012 Jul;19(5):377-8.

Xin W, Yang X, Rich TC, Krieg T, Barrington R, Cohen MV, Downey JM. All preconditioning-related G protein-coupled receptors can be demonstrated in the rabbit cardiomyocyte. *J Cardiovasc Pharmacol Ther*. 2012 Jun;17(2):190-8.

Yang J, Eliasson B, Smith U, Cushman SW, Sherman A. The size of large adipose cells is a predictor of insulin resistance in first-degree relatives of type 2 diabetic patients. *Obesity (Silver Spring)*. 2012 May;20(5):932-8.

II. PUBLISHED ABSTRACTS

Ballard ST, Cooper JL. The presence of mucous biomolecules limits transepithelial absorption of liquid across porcine tracheal epithelium. *Ped Pulmonol*. 2011;46(S34):248.

Krawiec JA, Townsley MI, Toomey JR, Willette RN, Lepore JJ, Thorneloe KS. Blockade of high vascular pressure activation of TRPV4 inhibits permeability in the isolated perfused rat lung: a novel strategy for treating pulmonary edema in heart failure. *Pharmacologist* 2012 Mar;54(1):44. Abstract no. 24. Available from: http://www.aspet.org/uploadedFiles/Publications/Journal_Search/v54n1_3_12.pdf

Taylor MS, Qian X, Francis M, Earley S, Solodushko V. Recruitment of dynamic cerebral artery endothelial Ca²⁺ signals by the TRPA1 channel activator AITC. *FASEB J*. 2012;26:853.2.

Thorneloe KS, Bao W, Alsaïd H, Jian MY, Costell M, Maniscalco K, Olzinski A, Gordon E, Lozinskaya I, Elefante L, Qin P, Matasic D, Kallal L, Waszkiewicz A, Davenport E, Larkin J, Burgert M, Eidam H, Goodman K, Toomey J, Roethke T, Jucker B, Schnackenberg C, Cheung M, Townsley MI, Lepore JJ, Willette RN. Discovery of orally active transient receptor potential vanilloid 4 (TRPV4) blockers for the treatment of pulmonary edema in heart failure. *Circulation*. 2011 Nov 22;124(21 Suppl 1):A13510.

Townsley MI, Alvarez DF. Pseudomonas aeruginosa-induced pulmonary edema-early impact on periarterial cuffs independent of ExoU or TRPV4. Am J Resp Crit Care Med. 2012 May 1;185:A5509. Available from: http://ajrccm.atsjournals.org/cgi/reprint/185/1_MeetingAbstracts/A5509

Townsley MI, Jian MY, Cheung M, Willette RN, Thorneloe KS. The selective TRPV4 antagonist GSK2263095A attenuates high venous pressure-induced lung injury in murine and canine lung. FASEB J. 2012;26:696.11.

Villalta PC, Rocic P, Townsley MI. Role of matrix metalloproteinases (MMP) 2 and 9 in TRPV4-induced lung injury. FASEB J. 2012;26:696.12.

Weber DS, Jadhav R, Dodd T, Smith E, Bennett JR, Rocic P. Sustained activation of p38 MAPK and MMP2 and 9 exacerbate neointima formation following vascular injury in metabolic syndrome rat. FASEB J. 2012;26:866.20.

Yang J, Eliasson B, Smith U, Cushman SW, Sherman A. Ameliorization of insulin resistance by rosiglitazone is associated with increased adipose cell size in obese type 2 diabetics. FASEB J. 2012;26:869.1.

Yang X-M, Liu Y, Cui L, Yang X, Liu Y, Tandon N, Kambayashi J, Downey JM, Cohen MV. Does blockade of platelet aggregation after stenting for STEMI protect against reperfusion injury? Circulation. 2011 Nov 22;124(21 Suppl 1):A13478.

III. PUBLISHED BOOKS

IV. INVITED PRESENTATIONS

Taylor MS. Invited speaker. Do you speak Ca²⁺? Generation, tuning and decoding of endothelial Ca²⁺ signals. University of Montreal; 2012 May 17; Montreal, Canada.

Taylor MS. Invited speaker. Dynamic Ca²⁺ signals in swine coronary artery endothelium. Institut de Cardiologie de Montreal; 2012 May 18; Montreal, Canada.

Taylor MS. Invited speaker. Recruitment of dynamic cerebral artery endothelial Ca²⁺ signals by the TRPA1 channel activator AITC. Experimental Biology 2012; 2012 Apr 25; San Diego, CA.

Townsley MI. Invited speaker. Interstitial barriers and fluid balance in the lungs. The Lung in Congenital Heart Disease. Heart Disease in the Young, American Heart Association Scientific Sessions 2011; 2011 Nov 15; Orlando, FL.

Townsley MI. Invited speaker. Calcium channels, lung endothelium, and acute lung injury – lessons in diversity. University of Mississippi Medical Center; 2012 May 16; Jackson, MS.

V. NATIONAL PROFESSIONAL RECOGNITION

Stephen T. Ballard: Reviewer, *American Journal of Physiology*, Study Section "Research Development Program," Cystic Fibrosis Foundation; Research Grants Letters of Intent, Cystic Fibrosis Foundation.

Michael V. Cohen: Editorial Board: *Basic Research in Cardiology*; Reviewer, Study Section, "Myocardial Ischemia and Metabolism", National Institutes of Health, *Journal of the American College of Cardiology*, *Cardiovascular Research*, *Hypertension*, *American Journal of Physiology*, *Journal of Applied Physiology*, *Basic Research in Cardiology*, *Cardiovascular Drugs and Therapy*, *British Journal of Pharmacology*, *Journal of Cardiovascular Pharmacology*; Grant Reviewer, National Institutes of Health.

James M. Downey: Editorial Board Member, *Circulation Research*, *Journal of Molecular and Cellular Cardiology*, *Basic Research in Cardiology*, *Cardiovascular Pharmacology and Therapeutics*.

Thomas M. Lincoln: American Heart Association: Council on Basic Sciences, American Society for Gene Therapy, and The Oxygen Society; Editorial Board Member, *Journal of Biological Chemistry*, *Molecular Pharmacology*, *Journal of Vascular Research*.

James C. Parker: Editorial Board Member, *International Journal of Physiology, Pathology and Pharmacology*; Reviewer, *American Journal of Physiology*, *Journal of Applied Physiology*, *American Journal of Respiratory and Critical Care Medicine*, *Critical Care Medicine*.

Mark S. Taylor: Reviewer, American Heart Association Study Section Vascular Biology and Hypertension, *American Journal of Physiology*, *Arteriosclerosis, Thrombosis and Vascular Biology*.

Mary I. Townsley: Fellow, Cardiovascular Section, American Physiological Society; Fellow, Council on Cardiopulmonary, Perioperative, Resuscitation and Critical Care, American Heart Association; Distinguished Achievement Award, Council on Cardiopulmonary, Perioperative, Resuscitation and Critical Care, American Heart Association; University Faculty Representative, Federal Demonstration Partnership; Member, NHLBI NITM Study Section; Member, CME Task Force on Peer Review, American Heart Association; Editorial Board, *Frontiers in Physiology*, *Vascular Physiology*, *Microvascular Research*; Reviewer: *American Journal of Physiology*, *American Journal of Respiratory and Critical Care Medicine*, *Circulation Research*.

David S. Weber: Member, American Physiological Society, Cardiovascular Section Trainee Committee; Ad hoc reviewer, NIH NHLBI Vascular Cell and Molecular Biology Study Section; Reviewer, "Vascular Biology, Blood Pressure/Regulation" Study Section,

American Heart Association; Reviewer, *Circulation Research*, *Microvascular Research*, *International Journal of Hypertension*, *American Journal of Hypertension*, *Experimental Cell Research*, *Nitric Oxide*, *Cellular Physiology and Biochemistry*, *AHA Scientific Sessions*.

VI. BRIEF SUMMARY OF ACTIVITIES AND PROGRESS

The Department of Physiology saw major changes this year with retirements, newly appointed faculty and changes in teaching as a result of new curriculum activities. Dr. James Downey and Dr. James Parker, both Professors of Physiology, retired in May after several decades of major contributions to the Institution and to their fields of expertise.

Dr. Downey came to the University in 1974 and was a faculty member with the inaugural class of students in the College of Medicine. He has authored hundreds of peer-reviewed papers and is recognized world-wide as a leading expert in cardiac preconditioning. Dr. Downey enjoyed continuous funding from the National Institutes of Health (NIH) and the American Heart Association over the decades. Dr. Parker came to the University in 1978 and is an internationally recognized authority in pulmonary physiology. He also is the author of many peer-reviewed papers and review articles in the field, and has been funded by the National Institutes of Health, the Parker B. Francis Foundation, and other agencies over his long career with the College of Medicine. Dr. Parker has been a member of the Center for Lung Biology since its founding. Both Dr. Downey and Dr. Parker remain as Emeritus Professors and are still active in research and teaching in the College of Medicine. A reception for their retirement was held on May 18th of this year at the University Faculty Club.

The Department of Physiology also welcomed new faculty member, Dr. Michael Lin, who joined the Department as an Assistant Professor in April of this year. Dr. Lin received his doctorate in Physiology from the Loma Linda School of Medicine in California and did his postdoctoral work at the Vollum Institute in Portland, Oregon. Dr. Lin was awarded the competitive NIH Transition Grant (R00) and is currently funded for his work on ion channel physiology.

The Department of Physiology faculty continues to be successful in receiving extramural grant support and contributing scientifically to their fields. Dr. Steve Ballard was awarded a state contract in collaboration with Auburn University Veterinary School for initiating a swine breeding program for investigating cystic fibrosis. Other faculty members have grants from the National Institutes of Health and the American Heart Association. Drs. Downey, Mark Taylor, Mary Townsley and Jian Yang delivered oral presentations at national and international meetings this year. Dr. Townsley was a regular member of the National Heart, Lung, Blood Institute NITM Study Section. Dr. David Weber served as a member of the NIH and National Heart, Lung, Blood Institute VCMB Study Section and is a regular member of the American Heart Association review panel for Vascular Biology/ Blood Pressure Regulation. The faculty in the Department of Physiology continue to serve on editorial boards of several national and international journals and are members of many scientific societies.

Several educational initiatives have been undertaken by members in the Department of Physiology. With the new medical curriculum being inaugurated this fall, the faculty who taught in the Medical Physiology course in the Spring Term used the Team-Based Learning (TBL) approach for conducting Case Studies. Course Director, Dr. David Weber, initiated the TBL approach in anticipation of its use this year for first and second year medical student education. In addition, faculty members in the Department of Physiology as well as several Ph.D. graduate students from the Basic Medical Sciences Graduate Program, engaged in a teaching outreach activity with the Palmer Pillans Middle School here in Mobile. These individuals spent a day each this past winter with seventh grade students in their "Human Biology" class talking with the students about various aspects of human anatomy and physiology and relating to them the importance of medical research.

The goal was to engage these youngsters in discussions about understanding how the body works and how science can be an interesting career choice as they move on with their education. Additional outreach activities are planned for next year with the Pillans students and other pre-high school students at other schools.

Graduate student activities are also an important part of the Department's educational mission. This year, our faculty taught in several Ph.D. level courses and Dr. Townsley continued her role as course director for "Biostatistics and Experimental Design." Dr. Weber, Associate Professor of Physiology, continues his role as the Director of the Vascular Biology Program and is the course director for "Research In Progress in Vascular Biology," a course which focuses on discussion of original research topics and literature reports. In addition, new courses in "Cardiovascular Physiology" and "Cardiovascular Pathology" are being constructed in the Vascular Biology focus area to replace the former Graduate Physiology Special Topics courses that were based on the former Medical Physiology course. Four students have graduated from the Basic Medical Sciences Graduate Program in Vascular Biology and are currently postdoctoral fellows – three at other institutions. Eight students are currently matriculating in the Vascular Biology focus area. Dr. Townsley continues her role as the Principal Investigator and Director on the NIH Institutional Training Grant in Lung Biology.