
2010-2011
Summary of Scholarly Activities
Department of Physiology

I. PUBLISHED JOURNAL ARTICLES, BOOK CHAPTERS, AND PATENTS

Ata H, Rawat DK, Lincoln T, Gupte SA. Mechanism of glucose-6-phosphate dehydrogenase-mediated regulation of coronary artery contractility. *Am J Physiol Heart Circ Physiol*. 2011 Jun;300(6):H2054-63.

Choi CS, Sellak H, Brown FM, Lincoln TM. cGMP-dependent protein kinase and the regulation of vascular smooth muscle cell gene expression: possible involvement of Elk-1 sumoylation. *Am J Physiol Heart Circ Physiol*. 2010 Nov;299(5):H1660-70.

Cohen MV, Downey JM. Ischemic postconditioning: from receptor to end-effector. *Antioxid Redox Signal*. 2011 Mar 1;14(5):821-31.

Cohen MV, Downey JM. Is it time to translate ischemic preconditioning's mechanism of cardioprotection into clinical practice? *J Cardiovasc Pharmacol Ther*. 2011 Sep;16(3-4):273-80.

Cohen MV, Yang XM, Liu Y, Solenkova NV, Downey JM. Cardioprotective PKG-independent NO signaling at reperfusion. *Am J Physiol Heart Circ Physiol*. 2010 Dec;299(6):H2028-36.

Grube K, Rudebusch J, Xu Z, Bockenholt T, Methner C, Muller T, Cuello F, Zimmermann K, Yang X, Felix SB, Cohen MV, Downey JM, Krieg T. Evidence for an intracellular localization of the adenosine A_{2b} receptor in rat cardiomyocytes. *Basic Res Cardiol*. 2011 May;106(3): 385-96.

Gupte RS, Ata H, Rawat DK, Abe M, Taylor MS, Ochi R, Gupte SA. Glucose-6-phosphate dehydrogenase is a regulator of vascular smooth muscle contraction. *Antioxid Redox Signal*. 2011 Feb 15;14(4):543-58.

Knowles C, Liu ZM, Yang J. Compensatory increase in lipogenic gene expression in adipose tissue of transgenic mice expressing constitutively active AMP-activated protein kinase- α 1 in liver. *Biochem Biophys Res Comm*. 2011 Aug 26;412(2):249-52.

Martens CJ, Inglis SK, Valentine VG, Garrison J, Conner GE, Ballard ST. Mucous solids and liquid secretion by airways: studies with normal pig, cystic fibrosis human and non-cystic fibrosis human bronchi. *Am J Physiol Lung Cell Mol Physiol*. 2011 Aug;301(2):L236-46.

Methner C, Schmidt K, Cohen MV, Downey JM, Krieg T. Both A_{2a} and A_{2b} adenosine receptors at reperfusion are necessary to reduce infarct size in mouse hearts. *Am J Physiol Heart Circ Physiol*. 2010 Oct;299(4):H1262-4.

Parker JC, Townsley MI. Control of TRPV4 and its effect on the lung. In: Kamkin A, Kiseleva I, editors. *Mechanosensitivity and mechanotransduction*. New York, NY; Springer; 2011. Chapter 10, p. 239-54. (*Mechanosensitivity in cells and tissues*, vol. 4).

Parker JC. Experimental and transgenic models of lung vascular permeability. In: Gillespie M, Stevens T, Wagner W, McMurtry I, editors. *Comprehensive physiology: respiration*. Bethesda, MD: American Physiological Society; 2011. Chapter 40, p. 835-82.

Perez J, Torres RA, Rocic P, Cismowski MJ, Weber DS, Darley-Usmar VM, Lucchesi PA. PYK2 signaling is required for PDGF-dependent vascular smooth muscle cell proliferation. *Am J Physiol Cell Physiol*. 2011 Jul;301(1):C242-51.

Sellak H, Lincoln TM, Choi CS. Stabilization of cGMP-dependent protein kinase G (PKG) expression in vascular smooth muscle cells: contribution of 3'UTR of its mRNA. *J Biochem*. 2011 Apr;149(4):433-41.

Tissier R, Chenoune M, Ghaleh B, Cohen MV, Downey JM, Berdeaux A. The small chill: mild hypothermia for cardioprotection? *Cardiovasc Res*. 2010 Dec 1;88(3):406-14.

Tissier R, Cohen MV, Downey JM. Does mild hypothermia protect against reperfusion injury? The debate continues. *Basic Res Cardiol*. 2011 Sep;106(5):691-5.

Yang J. Role of clusters in insulin-regulated GLUT4 trafficking in adipose cells: a new paradigm? (Commentary) *Int J Biol Sci*. 2010 Nov 25;6(7):716-8.

Yang X, Liu Y, Yang XM, Hu F, Cui L, Swingle MR, Honkanen RE, Soltani P, Tissier R, Cohen MV, Downey JM. Cardioprotection by mild hypothermia during ischemia involves preservation of ERK activity. *Basic Res Cardiol*. 2011 May;106(3):421-30.

Yang X, Xin W, Yang XM, Kuno A, Rich TC, Cohen MV, Downey JM. A_{2b} adenosine receptors inhibit superoxide production from mitochondrial complex I in rabbit cardiomyocytes via a mechanism sensitive to Pertussis toxin. *Br J Pharmacol*. 2011 Jul;163(5):995-1006.

Yap F, Craddock L, Yang J. Mechanism of AMPK suppression of LXR-dependent Srebp-1c transcription. *Int J Biol Sci*. 2011 May;7(5):645-50.

II. PUBLISHED ABSTRACTS

Ballard ST, Cooper JT. Presence of biomolecules in airway mucus impedes absorption of liquid across porcine tracheal epithelium. *FASEB J.* 2011;25:659.15.

Cui L, Yang XM, Yang X, Cohen M, Downey JM. Cantharidin, a phosphatase inhibitor, protects the heart from ischemic injury through a U0126-sensitive mechanism. *J Mol Cell Cardiol.* 2011 Sep;51(3 Suppl):S8-9. Abstract no. 027.

Francis M, Solodushko V, Taylor MS. High throughput analysis of spontaneous endothelium calcium dynamics in porcine coronary arteries. *FASEB J.* 2011;25:820.20.

Hashizume M, Mouner M, Gillespie M, Chouteau J, Parker JC. Mitochondrial DNA repair enzymes attenuate ventilator induced lung injury. *FASEB J.* 2011;25:1101.10.

Parker JC, Kelley S, Mayer A, Mouner M, Hashizume M, Townsley MI. Myosin light chain kinase regulates the surface expression and calcium entry through transient receptor potential vanilloid 4 channels in rat pulmonary microvascular endothelial cells. *FASEB J.* 2011;25:1101.1.

Sellak H, Lincoln TM, Wu S. Sox9 and KLF4 transcription factors antagonize β -catenin and inhibit TCF-activity in cancer cells. *FASEB J.* 2011;25:115.10

Tran CH, Taylor MS, Plane F, Nagaraja S, Tsoukias N, Welsh DG. Solving the enigma of myoendothelial feedback. *FASEB J.* 2011;25:817.7.

Yang X, Liu Y, Yang XM, Hu F, Cui L, Cohen M, Downey J. Cardioprotection from mild hypothermia during ischemia depends on ERK activity. *J Mol Cell Cardiol.* 2011 Sep;51(3 Suppl):S14. Abstract no. 043.

Yang XM, Tandon N, Liu Y, Kambayashi J, Cui L, Liu Y, Downey J, Cohen MV. Blocking platelet activation in rabbits of monkeys protects against infarction by postconditioning-like signaling. *J Mol Cell Cardiol.* 2011 Sep;51(3 Suppl):S14. Abstract no. 045.

Yang J, Xie X, Anderson DE, Stenkula KG, Yver DR, Meyer C, Cushman SW. Identification of new molecular components in the GLUT4 clusters in the plasma membrane of adipose cells by mass spectrometry-based proteomics. *FASEB J.* 2011;25:534.10.

III. PUBLISHED BOOKS

IV. INVITED PRESENTATIONS

Downey JM. Invited speaker. Adenosine A_{2b} receptors in cardioprotection. International Society for Heart Research; 2011 May 25; Philadelphia, PA.

Parker JC. Invited speaker. Tracheal liquid insufflation assisted total liquid ventilation. First International Conference on Applied Bionics and Biometrics ICABB-2-10; 2010 Oct 16; Venice, Italy.

Parker JC. Invited speaker. Myosin light chain kinase regulates the surface expression and calcium entry through transient receptor potential vanilloid 4 channels in rat pulmonary microvascular endothelial cells. *Experimental Biology* 2011; 2011 Apr 14; Washington, DC.

Taylor MS. Invited speaker. New perspectives on the generation, tuning and decoding of Ca^{2+} signals in the vasculature; Colorado State University; 2010 Oct 20; Fort Collins, CO.

Taylor MS. Invited speaker. Generation, tuning and decoding of endothelial Ca^{2+} signals. Smooth Muscle Underground Conference; 2011 Apr 8; Washington, DC.

Yang J. Invited speaker. Identification of new molecular components in GLUT4 clusters in the plasma membrane of adipose cells by MS-based proteomics – a pilot study. NIDDK/NIH; 2010 Nov 8; Bethesda, MD.

Yang J. Invited speaker. Identification of new molecular components in the GLUT4 clusters in the plasma membrane of adipose cells by mass spectrometry-based proteomics. *Experimental Biology* 2011; 2011 Apr 10; Washington, DC.

V. NATIONAL PROFESSIONAL RECOGNITION

Stephen T. Ballard: Reviewer, *American Journal of Physiology*, Study Section on 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 on 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*; Co-organizer of Adenosine Symposium held in conjunction with the American Heart Association Scientific Sessions.

Thomas M. Lincoln: 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 on Vascular Biology and Hypertension, *American Journal of Physiology, Arteriosclerosis, Thrombosis and Vascular Biology*.

Mary I. Townsley: NHLBI NITM Study Section; Chair, Unified Peer Review Steering Committee, American Heart Association; Editorial Board, *Frontiers in Physiology, Vascular Physiology, Microvascular Research, and Pulmonary Circulation*; Reviewer: *American Journal of Physiology, American Journal of Respiratory and Critical Care Medicine, Circulation Research, Microcirculation, Respiratory Physiology*.

David S. Weber: Cardiovascular Section Trainee Committee; Unified Peer Review Committee "Vascular Biology, Blood Pressure/Regulation" Basic Science 2 American Heart Association; Reviewer, *Circulation Research, American Journal of Physiology, Journal of Molecular and Cellular Cardiology, Microvascular Research, Antioxidants and Redox Signaling*.

VI. BRIEF SUMMARY OF ACTIVITIES AND PROGRESS

The Department of Physiology maintained excellent overall extramural funding for 2010-2011. Dr. Thomas Lincoln was awarded a competitive renewal grant from NIH for his work, while Drs. Michael Cohen and Mary Townsley received awards from pharmaceutical companies. In total, the Department of Physiology has over \$2.5 million in extramurally funded awards over the past year. Faculty in the Department of Physiology maintained high visibility in local, national and international scientific communities. Several faculty members (Drs. Downey, Parker, Taylor, Townsley and Yang) presented external seminars and invited symposium talks at scientific meetings. Drs. Cohen, Downey, Lincoln and Townsley served on the Editorial Boards of several scientific journals. Dr. Townsley served as Chair for the site visit by an external review team for the BMS Graduate Program. Drs. Lincoln and Townsley conducted a "Careers in Industry" workshop in May 2011. Drs. Kevin Thorneloe with GlaxoSmithKline and Randolph Johnson with Kai Pharmaceuticals, respectively, opined on career opportunities available to graduate students and postdoctoral fellows.

Two graduate students working under the direction of faculty members in the Department of Physiology completed dissertations this past year. Drs. Dana Skarra (Dr. Mark Taylor, Mentor) and Rebecca Torres (Dr. David Weber, Mentor) received their doctorate degrees and are doing postdoctoral training at the University of California, San Diego and Emory University, respectively. Departmental faculty sponsored medical students in the Summer Medical Student Research Program and two students in the Summer Undergraduate Research Program.

Teaching activities continue in the Department of Physiology. Dr. Townsley continued her role as course director for “Statistics and Experimental Design in Biomedical Research” and “Effective Scientific Writing.” Dr. Lincoln continued as course director for Medical Physiology and Graduate Physiology Special Topics. Dr. Weber is the Director of the Vascular Biology Graduate Program, a focus area for Basic Medical Sciences. The Physiology faculty continues to be actively involved in the “Fundamentals of Basic Medical Sciences” course offered in the first year. Dr. Mary Townsley continues to serve as the Principal Investigator on the NIH-funded Institutional Training Grant in Lung Biology.