In the Spotlight

Bill Durante, PhD

My laboratory has a long-standing interest in exploring the regulation and function of endogenously derived gases, such as nitric oxide, carbon monoxide, and hydrogen sulfide. Although long considered nothing more than environmental or industrial pollutants, these small, water-soluble, membrane-permeable gases are produced by humans and other organisms, and represent an emerging class of signaling molecules. While high concentrations of these gases are unquestionably lethal, low levels play an important physiological role in the circulation. Studies from my laboratory have characterized the release of these gases from vascular cells and show that they regulate critical biological processes including proliferation, migration, apoptosis, contractility, and inflammation. When applied at low concentration, these gases elicit salutary effects in preclinical animal models of hypertension, atherosclerosis, post-angioplasty restenosis, ischemia/reperfusion injury, and metabolic disease. More recently, we discovered that vascular cells generate a fourth gas, ammonia, which functions to modify cell survival. Current research is investigating how alterations in the production of these gases trigger the development and progression of cardiovascular disease in diabetes and obesity. Ongoing studies are also elucidating interactions between these gases and determining how cross-talk among gases influences vascular cell function. Since these gases are formed from amino acids, we are also studying how the transport and metabolism of amino acids by vascular cells is coordinated by specific biochemical and biophysical stimuli to modulate endogenous gas production. This work has been funded by the National Institutes of Health, American Heart Association, Juvenile Diabetes Research Foundation, and the American Diabetes Association.

Funding

Craig Emter, PhD, University of Missouri, Biomedical Sciences;
Michael Kapiloff, MD, PhD, Stanford University, Departments of Ophthalmology and Medicine;
Tim Domeier, PhD, University of Missouri, Medical Pharmacology and Physiology;
Scott Rector, PhD, University of Missouri, Internal Medicine/Nutrition and Exercise Physiology

Nearly half of all heart failure patients are diagnosed with Heart Failure with Preserved Ejection Fraction (HFpEF), and this subset of heart failure patients is difficult to treat clinically. Heart Failure with Preserved Ejection Fraction associates with advancing age, hypertension, obesity, metabolic syndrome, and kidney disease, and is highly prevalent in females. The laboratories of Craig Emter (MU Biomedical Sciences), Michael Kapiloff (Stanford University), Tim Domeier (MPP), and Scott Rector (MU Internal Medicine/Nutrition and Exercise Physiology) are testing a HFpEF therapy based upon inhibition of p90 ribosomal S6 kinase type 3 (RSK3). The therapy utilizes an adenovirus gene therapy vector called “RBD” (for “RSK3 binding domain”) that expresses a RSK3 anchoring disruptor peptide. A recently funded Department of Defense grant (3 years, $2.25 million) will allow the group to test the RBD biologic in a Western Diet-fed female Ossabaw swine model of HFpEF, with the overall goal of translating this research into novel therapies for a disease with limited current treatment options.

Check out the newly launched Medical Pharmacology and Physiology website.

Make sure your information and publications are current. Email Liz with corrections, changes or additions.
Cardiovascular Day of Missouri was proclaimed on February 27th, 2018. It marked the silver anniversary of the annual Cardiovascular Day of Missouri. Cardiovascular Day provides a forum for scientists, trainees, and clinicians to share discoveries and plan for next series of advances toward understanding how the cardiovascular system functions in health and disease. The 25th annual Cardiovascular Day started with opening remarks from Dr. Mun Choi, President of the University of Missouri. President Choi captivated the audience with exciting news about the state of biomedical research at MU and the value of Cardiovascular Research for the citizens of Missouri. Cardiovascular Day Schedule of Events included two oral presentation sessions, over 40 scientific posters, and was highlighted by the James O. Davis Chancellor’s Distinguished Lecture. The keynote speaker was Dr. Andrew McCulloch, Distinguished Professor of Bioengineering and Medicine at the University of California San Diego. Dr. McCulloch provided a state-of-the-art presentation on multi-scale modeling and systems mechano-biology of the heart and how this information is being leveraged to improve precision medicine treatments in heart failure patients. MPP would like to thank the members of the Organizing Committee, Kerry McDonald, Maike Krenz, Chris Baines, and Juliana Lindsey; Jason Lee for IT management; and Maike Krenz and Laurin Hanft for organizing the poster competition. 2018 Cardiovascular Day pictures are available at #MUCVDay.

MPP Graduate Students and Postdoctoral Fellows Win Awards for Best Posters at MU’s Campus-Wide Cardiovascular Day XXV Research Forum

Deborah Peana, MPP Graduate Student in the laboratory of Dr. Tim Domeier, won second place in the Graduate Student Poster Contest for her poster entitled “TRPV4 INCREASES CARDIOMYOCYTE CALCIUM TRANSIENTS AND CONTRIBUTES TO CARDIAC DAMAGE FOLLOWING ISCHEMIA-REPERFUSION IN HEARTS OF AGED MICE”.

Ghazaleh Behnammanesh, MPP Graduate Student in the laboratory of Dr. Bill Durante, won third place in the Graduate Student Poster Contest for her poster entitled “CANAGLIFLOZIN INHIBITS HUMAN ENDOTHELIAL CELL FUNCTION”.

Scott Zawieja, Ph.D., Postdoctoral Fellow in the laboratory of Dr. Mike Davis, won first place in the Post-Doctoral Poster Contest for his poster entitled “Identification of Potential Lymphatic Pacemaker Cells Using Selective Inducible Cre Driven Expression of Fluorescent Reporters and Calcium Sensors”.

Jorge Castorena-Gonzalez, Ph.D., Postdoctoral Fellow in the laboratory of Dr. Mike Davis, won second place in the Post-Doctoral Poster Contest for his poster entitled “Endothelium-dependent modulation of the contractile function of collector lymphatics”.

Congratulations to these MPP graduate students and postdoctoral fellows, and to all of the other research trainees who competed for these awards and provided a very high level of competition for these awards. We also extend a very special thanks to the Poster Judges for their hard work and informed judgement. They faced a daunting task in ranking these presentations, as the poster quality was once again very strong this year.
Recent Publications


Where are they now?

Rolando E. Rumbaut, M.D., Ph.D.

I joined Dr. Virginia Huxley’s laboratory as a graduate student in 1993. By that time, I was already an M.D. and I had completed my Internal Medicine residency. I was half-way through clinical training in Pulmonary & Critical Care Medicine. I became interested in microcirculation since many critically ill patients with inflammatory conditions develop organ dysfunction as a result of microvascular alterations. In addition to being a graduate student in the Department of Physiology (before it became the Department of Medical Pharmacology and Physiology), I was a clinical fellow and later an Assistant Professor of Medicine. I earned my PhD in 1998, remained at Mizzou as faculty member in Medicine until 2000, when I moved to Baylor College of Medicine and the Michael E. DeBakey VA Medical Center in Houston. Currently, I am Professor of Medicine and Pediatrics at Baylor College of Medicine, Director of the Center for Translational Research on Inflammatory Diseases and Deputy Associate Chief of Staff for Research at our VA Medical Center. I maintain a research program in microvascular inflammation, emphasizing the role of platelets in the microcirculation. My leadership roles are focused towards promoting collaborative research and mentoring of early career researchers, including junior faculty, fellows and students. I learned a great deal during my time at Mizzou: how to do quality science, disseminate scientific findings, and how to communicate my research interests effectively to funding agencies. Perhaps the most important lessons were the value of collaboration in research, the notion that being a scientist improves one’s practice as a physician, and the importance of effective mentoring. I apply these lessons routinely in my current leadership roles; most of the researchers and trainees in my research center are physician-scientists. I get the most satisfaction and pride from serving as a mentor to the next generation of physicians and scientists. I owe it to a great extent to my time at Mizzou and Dr. Huxley’s mentorship.

From left: Fong W. Lam, M.D., (NIH K08-funded Pediatric Critical Care faculty, recipient of the 2017 Microcirculatory Society Travel Award for Outstanding Young Investigator), Rolando E. Rumbaut, M.D., Ph.D. (Dr. Lam’s mentor, recipient of this award in 2004), Virginia H. Huxley, Ph.D. (Dr. Rumbaut’s mentor, recipient of this award in 1988)
Seminar/Symposia/Lecture Presentations

Bill Durante
Gasotransmitters in Vascular Injury and Disease. February 12, 2018. Department of Medicine, University of Missouri, Columbia, MO.


Kerry McDonald

Mike Davis

Using optogenetics to uncover mechanisms and modulators of lymphatic pacemaking. March 12, 2018. Il CHicco, Italy.

NIH new R01 deadline is June 5th.

Check out the MPP Intranet website
Where you have simple access to daily information and downloadable department forms using your pawprint.

Why did the germ cross the microscope?
(Find the answer at this site.)

Let’s go bowling!
Tuesday, May 15th
Sign up at Liz’s desk and get further information

CONGRATULATIONS
Charmain Fernando received a Zweifach Student Travel Award from the Microcirculatory Society.

Chuck Norton received the American Physiological Society Cardiovascular Section Research Recognition Award.

Upcoming Events
- **ATVB/PVD 2018** (May 9—12, 2018), San Francisco, CA.
- **Lymphatic Education & Research Network Conferences** (Mar—Nov 2018)
- **Gordon Research Conferences** (Feb—July 2018)
- **International Society for Heart Research**, meetings February—December, 2018
- **Digestive Disease Week**, Washington, DC, June 2-5, 2018
- **Keystone Conferences** January—November 2018.
- **NAVBO**, Newport, RI, October 14—18, 2018.
- **European Society for Microcirculation**—SAVE the DATE for 2019, April 15—18.

**MEDICAL PHARMACOLOGY AND PHYSIOLOGY**
**SCHEDULE OF SEMINARS**
**SPRING SEMESTER 2018**

Tuesdays 12:00 – 1:00 pm: MA217 Acuff Auditorium: Med Sci Building

May 1 Brandon Biesiadecki, PhD (host: Kerry McDonald, PhD), Associate Professor, Department of Physiology and Cell Biology, Ohio State University
“Tyrosine phosphorylation: A new player in heart function”

May 8 Cheryl Heesch, PhD, Professor, Department of Biomedical Sciences, University of Missouri
Virginia Huxley, PhD

I came in November (Thanksgiving weekend) of 1984 from an Assistant Research Professor position at the University of California-Davis.

Favorite vacation— I love to sail so my favorite vacations have involved being on the water - the best were with my graduate faculty mentor, and 4 others on the Chesapeake Bay for a week in the spring and a week in the fall.

If you could travel anywhere — I still would really like to cruise the Nile river - I have always been fascinated by history, architecture and the colliding of cultures.

Favorite animal— Hands down, my favorite animals that I own are my English Springer Spaniels - their versatility thrills me. If I were a woman of means, I would have loved to have worked with Gypsy Vanner horses. They look like an equine Springer, are super smart and have a wicked sense of humor.

Something you have always wanted to do— As a sailor I have always wanted to fly a glider - the ocean of the air and aerodynamics calls the way hydrodynamics and sailing does. The idea that you can harness the forces of air and water is simply a treat.

Laurin Hanft, PhD

I am currently a research scientist in the McDonald Lab. I moved to Columbia to start a postdoctoral fellowship in the lab in November 2005 and had so much fun examining muscle mechanics and myofibrillar protein biochemistry that I never left.

Favorite vacation—My favorite vacation to date was a family trip to Arizona because this trip combined almost all of my favorite things in a single day. My husband and I set out at sunrise to hike to the top of Flat Iron Mountain. I was not sure I would make it due to a running injury, but I stuck with it and conquered the ~3000 foot ascent and was rewarded with some pretty breath-taking views of the Superstition Mountains. After the hike, we got to relax by the pool, I played a couple of games of pickle ball with my kids, and then enjoyed lots of good food and even a few tequilas that evening.

If you could travel anywhere—Although there are many places I would love to go I think hiking the hillsides of Italy is at the top of my list. Anytime I can combine nature and good food I am pretty much in heaven.

Favorite animal—I absolutely love dogs. They are the most loyal, loving, and gentle creatures. They are never in a bad mood and will work so hard to communicate with their people. Any stresses of the day are melted away with just a few doggie kisses.

Something you want to do—One item on my bucket list is to go on a hike at a state or national park in every state in the U.S. It always amazes me how different ecosystems can be in each region or state. So far, I have hiked in 17 states. I have a family vacation to Yellowstone planned this summer with a 24 mile hike on the itinerary so I hope to add another state to my list soon.