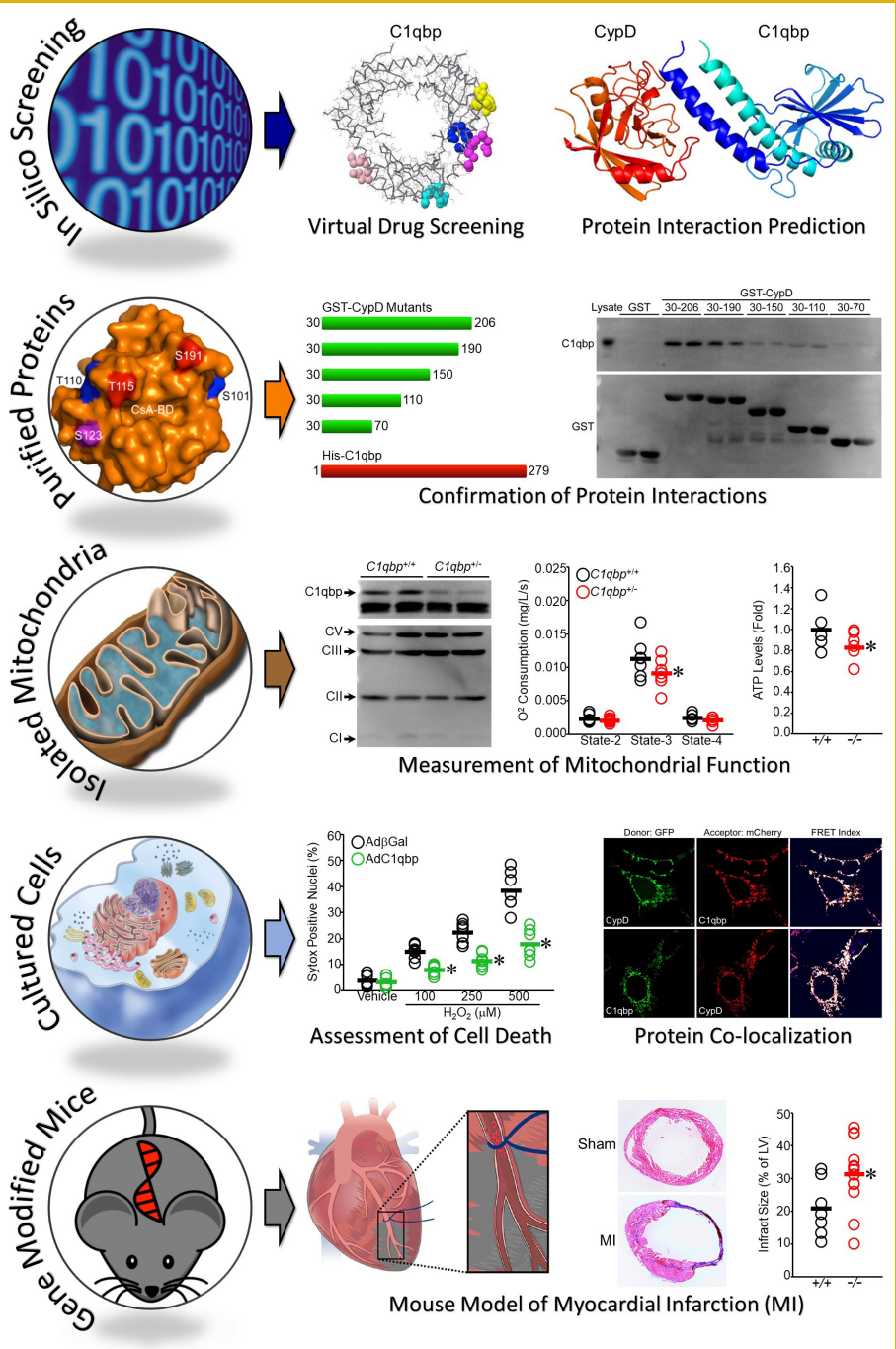




Dalton Cardiovascular Research Center

Committed to Interdisciplinary Collaboration in Research and Teaching

2020



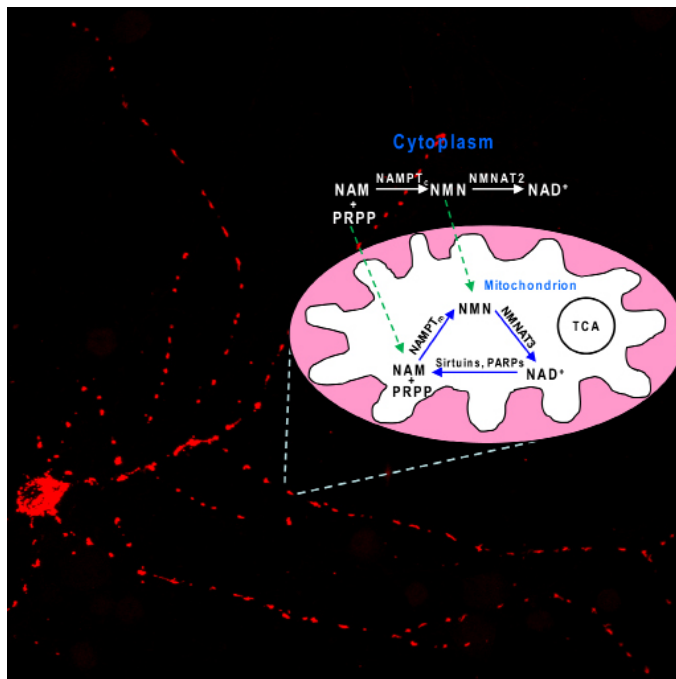


Image Courtesy of **Shinghua Ding, PhD** Professor of Biomedical, Biological and Chemical Engineering (BBCE), Dalton Resident Investigator

NAD⁺ salvage pathway in mitochondria in neurons. Background shows an neurons transfected with mRFP in mitochondria.

Research Interests: Ischemic stroke, neural degeneration and regeneration, glial function, glia-neuron interactions, in vivo two-photon imaging.

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dalton.missouri.edu

From the Director

The Dalton Cardiovascular Research Center (DCRC) supports the objectives of the University of Missouri in its mission of teaching, research and service. Yet it is unique in its commitment to interdisciplinary collaborative research and teaching among various colleges, schools and departments across the Columbia campus. Under the auspices of DCRC, scientists from the fields of biochemistry, biological engineering, biological sciences, biomedical sciences, electrical engineering, medicine, pharmacology, physiology, physics, and veterinary medicine and surgery all come together and apply their particular expertise to research problems.

Our commitment to collaboration is grounded in the belief that interactions among scientists of diverse backgrounds will lead to multidisciplinary research producing meaningful, far-reaching results. Our commitment to collaboration is grounded in the belief that interactions among scientists of diverse backgrounds will lead to multidisciplinary research producing meaningful, far-reaching results. Research programs at DCRC include investigations into cardiac functions, cystic fibrosis, exercise, kidney failure, membrane transport, muscular dystrophy, neurohumoral control of the circulation, shock, vascular wall biology, diabetes, hypertension, biomedical engineering, protein-protein interactions, and tumor angiogenesis. Because the mission of DCRC is to promote interaction and collaboration, no single group completely defines the research activity of its members.

The center is committed to excellence in cardiovascular research and in the education of students and fellows. Our investigators provide service to the University, the State of Missouri, and the nation through memberships on committees, peer review panels and editorial boards of scientific journals.

The Dalton Cardiovascular Research Center is accredited by both the American Association for the Advancement of Laboratory Animal Care and the American Association of Laboratory Animal Sciences.

Michael A. Hill, PhD
Interim Director, Dalton Cardiovascular Research Center
Professor, Medical Pharmacology & Physiology



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Focused on Understanding the Cardiovascular System During Development, Aging, & Disease
Through Interdisciplinary Collaboration in Research and Teaching with Academic and Industry Partners

CENTER INFORMATION

CORE TECHNOLOGIES

Atomic Force microscopy
Confocal/multiphoton microscopy
In vivo video microscopy
Chronic instrumentation
Electrophysiology
Quantitative PCR
Nanofabrication
Cell tissue culture
Gene expression
Manipulation of protein expression
Fluorescence spectroscopy
Cardiovascular and microvascular models
High Frequency Ultrasound Imaging

CORE FACILITIES

Leica SP5 confocal multiphoton system
FV 1000 Olympus confocal systems
High Speed Spinning disk confocal
Atomic Force Microscopy Systems
Research grade fluorescence microscopes
Molecular and cellular technology core
Information technology core
Vevo LAZR Photoacoustic Imaging System
Telemetry
Laser Speckle Imaging
Any-Maze System
Ivis Imaging
Metabolic Cages

Interdisciplinary Research Interest Groups

Biomedical Engineering
Microcirculation
Exercise/Inactivity
Vascular Biology
Membrane Transport
Cystic Fibrosis
Tumor Angiogenesis
Neurohumoral Control of
Circulation
Cardiac Muscle, Development
& Disease

Facilities

Erected 1967-1969
33,456 Square Feet
21 Research Labs





Christopher P. Baines, PhD plates cells on a petri dish to grow both fibroblasts and cardiac cells.

Dr Baines is a Resident Dalton Investigator and Associate Professor, Department of Biomedical Sciences, College of Veterinary Medicine

The mitochondrial permeability transition pore: Is it formed by the ATP synthase, adenine nucleotide translocators or both? **Baines CP**, Gutiérrez-Aguilar M. *Biochim Biophys Acta Bioenerg.* 2020 Oct 1;1861(10):148249. doi: 10.1016/j.bbambio.2020.148249. Epub 2020 Jun 20. PMID: 32569662

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Academic Partners

College of Arts and Science
Physics & Astronomy

College of Engineering
Bioengineering, Electrical &
Computer Engineering

College of Veterinary Medicine
Biomedical Sciences

School of Medicine
Biochemistry
Center for Gender Physiology
Medical Pharmacology & Physiology
Internal Medicine
Pathology and Anatomical Sciences

College of Human Environmental Sciences
Nutrition & Exercise Physiology

External Sector Collaborations

International

Univ of Calgary (CA),
Univ of Sheffield (UK)
Univ of Oxford (UK)
International University of Health and
Welfare, Japan
National Yang Ming Chiao Tung
University, Taiwan
Southwest Medical Univ(CN)
National Taiwan University

Domestic

ABBVIE Inc, Novopyxis, Inc
Case Western University
State University of IOWA
Exocytronics, LLC
Tensive Controls, Inc
Gilead Sci, Inc
Tufts University
University of IL Urbana, Champaign
Pennington Biomed Research Ctr,
Washington University, St. Louis
Proteostasis Therapeutics, Inc
University of IL, Chicago

Phenotype Facility
with VisualSonics Vevo 2100 System



RESIDENT INVESTIGATORS



Christopher P. Baines, PhD
Associate Professor, Department of Biomedical Sciences



Lane L. Clarke, DVM, PhD,
Professor, Department of Biomedical Sciences



Kevin J. Cummings, Ph.D.
Assistant Professor, Department of Biomedical Sciences



Shinghua Ding, PhD
Associate Professor, Biological Engineering



Kevin D. Gillis, DSc, Professor Biological Engineering
Professor Medical Pharmacology and Physiology

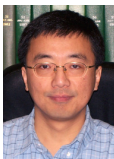


Olga Glinskii, MD
Assistant Research Professor

RESIDENT INVESTIGATORS



Vladislav Glinskii, MD
Pathology and Anatomical Sciences



Li-Qun (Andrew) Gu, PhD
Associate Professor, Bioengineering



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Professor, Department of Biomedical Sciences
Adjunct Professor, Medical Pharmacology and Physiology



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Interim Director, Dalton Cardiovascular Research Center
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Professor, Department of Biomedical Sciences



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Associate Professor, Department of Biomedical Sciences



Maike Krenz, MD
Associate Professor, Department of Medical Pharmacology and Physiology



Camila Manrique Acevedo, MD
Endocrinology/Metabolism/Diabetes, Internal Medicine



Luis Martinez-Lemus, PhD, DVM
Associate Professor, Department of Medical Pharmacology and Physiology

RESIDENT INVESTIGATORS



Jaume Padilla, PhD
Assistant Professor Nutrition & Exercise Physiology



Luis Polo-Parada, PhD
Associate Professor, Department of Medical Pharmacology and Physiology



Lakshmidevi Pulakat, PhD
Professor, Department of Medicine - Cardiology



James R Sowers, MD
Vice Chair, Professor of Medicine



Zhe Sun, PhD
Assistant Research Professor, Dalton Cardiovascular Research Center



Xiaoqin Zou, PhD
Professor, Department of Physics and Department of Biochemistry

EMERITUS DALTON INVESTIGATORS



Edward H. Blaine, PhD, DSc(Hon)

Professor, Department of Medical Pharmacology & Physiology
Former Director, Dalton Cardiovascular Research Center 1990-2005
"Hypertension, heart failure, and salt and water balance."

Discovery of Angiotensin converting enzyme inhibitor

1962 NFL Draft, Offensive Line Green Bay Packers, retired after 5th season with the Philadelphia Eagles to come back to Mizzou for his doctorate. (5 years, a promise to mentor, Clint Conaway)

Distinguished Eagle Scout by the Boy Scouts of America, 2009
Missouri Sports Hall of Fame, 2011



Gerald A. Meininger, PhD, Emeritus Professor

Margaret Proctor Mulligan Professor in Medical Research
Professor, Department of Medical Pharmacology and Physiology
Former Director, Dalton Cardiovascular Research Center 2005-2015
Adjunct Professor, Department of Biomedical Sciences
Adjunct Professor, Department of Biological Engineering

Reduced stiffness and augmented traction force in type 2 diabetic coronary microvascular smooth muscle. McCallinhart PE, Cho Y, Sun Z, Ghadiali S, **Meininger GA**, Trask AJ. Am J Physiol Heart Circ Physiol. 2020 Jun 1;318(6):H1410-H1419. doi: 10.1152/ajpheart.00542.2019. Epub 2020 May 1. PMID: 32357115

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Non- Resident Investigators



Shawn B. Bender, Ph.D.
Assistant Professor, Department of Biomedical Sciences



Frank W. Booth, PhD
Professor, Department of Biomedical Sciences



Douglas K. Bowles, PhD
Professor, Department of Biomedical Sciences
Adjunct Professor, Department of Medical Pharmacology and
Physiology



Nicola J. Brown, Ph.D.
Adjunct Dalton Investigator
Sheffield Cancer Research Centre



Chandrasekar Bysani, D.V.M., Ph.D.
Margaret Proctor Mulligan Endowed Professor



Michael J. Davis, PhD
Professor and Associate Department Head, Department of Medical
Pharmacology and Physiology

Non- Resident Investigators



William P. Fay, M.D.
Professor of Internal Medicine and Medical Pharmacology & Physiology



Shubra Gangopadhyay, PhD
LaPierre Chair and Joint Professor, Departments of Electrical Engineering, Biological Engineering and Physics



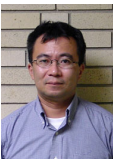
Kenneth A. Gruber, Ph.D.
Adjunct Professor, Department of Medical Pharmacology and Physiology



Nicole L. Nichols, Ph.D.
Assistant Professor, Department of Biomedical Sciences



Steven S. Segal, PhD
Professor of Medical Pharmacology and Physiology



Yoshiro Sohma, MD, PhD
Visiting Professor, Dalton Cardiovascular Research Center

Publications

Commentary: COVID-19 in patients with diabetes. **Hill MA**, Mantzoros C, **Sowers JR**. *Metabolism*. 2020 Jun;107:154217. doi: 10.1016/j.metabol.2020.154217. Epub 2020 Mar 24. PMID: 32220611

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Publications

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Publications

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Measurement of Pulse Propagation Velocity, Distensibility and Strain in an Abdominal Aortic Aneurysm Mouse Model. Sharma N, **Sun Z, Hill MA, Hans CP**. *J Vis Exp*. 2020 Feb 23;(156). doi: 10.3791/60515. PMID: 32150160

Publications

Structural basis of prostate-specific membrane antigen recognition by the A9g RNA aptamer. Ptacek J, Zhang D, Qiu L, Kruspe S, Motlova L, Kolenko P, Novakova Z, Shubham S, Havlinova B, Baranova P, Chen SJ, **Zou X**, Giangrande P, Barinka C. *Nucleic Acids Res.* 2020 Nov 4;48(19):11130-11145. doi: 10.1093/nar/gkaa494. PMID: 32525981

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Publications

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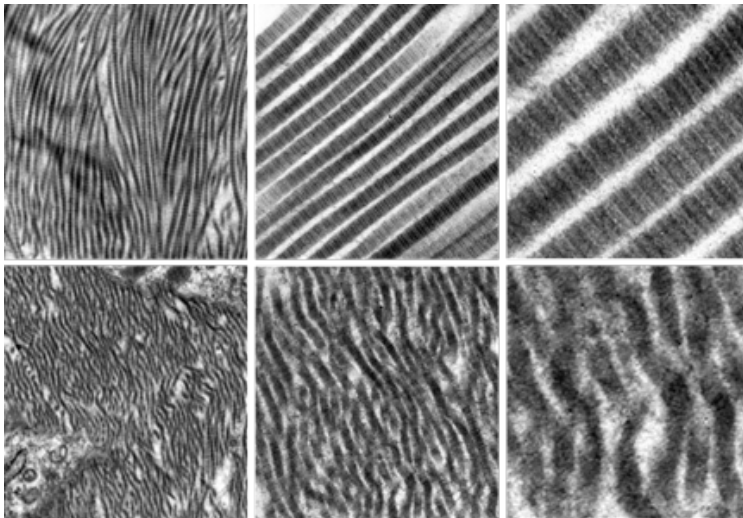


Image above courtesy of Chetan P. Hans, PhD. The cover image of this issue of Clinical Science (volume 134, issue 22) features representative transmission electron microscopy images of normal (top panel; AngII + DAPT) and abnormal collagen fibrils (bottom panel; AngII + vehicle) in the mouse aorta. In their study, Hans et al. highlight the novel therapeutic potentials of Notch inhibitor (DAPT) to regress an actively growing abdominal aortic aneurysm via divergent pathways.



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