Dalton Cardiovascular Research Center

Committed to Collaboration in Research and Teaching

Annual Report 2001

The University of Missouri-Columbia
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Summary of Accomplishments

Publications and Presentations
104 articles published
114 abstracts published
65 invited presentations

Awards and Peer Review
14 awards received
14 investigators serve on editorial boards of 10 scientific journals
21 investigators review articles for 66 scientific journals
10 investigators review grant applications for 13 granting agencies
7 investigators serve on nine national study sections

Education and Training
38 postdoctoral fellows
16 graduate students
10 undergraduate students
3 high school students

Overview
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 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 sciences, electrical engineering, medicine, physiology, pharmacology, veterinary biomedical sciences, and veterinary medicine and surgery 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. Research programs at DCRC include investigations into cardiac function, cystic fibrosis, exercise, kidney failure, membrane transport, muscular dystrophy, neurohumoral control of the circulation, shock, vascular wall biology, and biomedical engineering. 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. Twenty-seven Dalton investigators provide service to the University, the State of Missouri, and the nation through membership on committees,
peer review panels, and editorial boards of scientific journals. During the period of this report, our investigators published over 104 manuscripts in nationally recognized journals and books and gave over 60 scientific presentations.

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

**DCRC Internal Advisory Board**
Lex Akers, Ph.D., Professor and Chair of Electrical Engineering  
John D. David, Ph.D., Professor and Chair of Biological Sciences  
Robert Hall, Ph.D., J.D., Vice Provost for Research (Interim)  
Gerald L. Hazelbauer, Ph.D., Professor and Chair of Biochemistry  
Allan W. Jones, Ph.D., Professor and Chair of Physiology  
M. Harold Laughlin, Ph.D., Professor and Chair of Veterinary Biomedical Sciences  
Cecil P. Moore, Ph.D., Professor an Chair of Veterinary Medicine and Surgery  
Arnold L. Smith, M.D., Professor and Chair of Molecular Microbiology and Immunology  
Jinglu Tan, Ph.D., Professor and Chair of Biological Engineering

**DCRC External Advisory Board**
Kenneth Baldwin, Ph.D., Professor of Physiology & Biophysics, University of California at Irvine  
Alan Kim Johnson, Ph.D., Professor of Pharmacology & Psychology, University of Iowa  
Saulo Klahr, M.D., Professor of Medicine and Director of Nephrology, Washington University School of Medicine  
Luis Reuss, M.D., Professor and Chair, Physiology and Biophysics, University of Texas Medical Branch
Dalton Investigators

Edward H. Blaine, PhD, DSc(Hon): Director of Dalton Cardiovascular Research Center, Professor of Physiology and of Pharmacology

Frank W. Booth, PhD: Professor of Veterinary Biomedical Sciences

Douglas K. Bowles, PhD: Assistant Professor of Veterinary Biomedical Sciences

Chang Wen Chen, PhD: Assistant Professor of Electrical Engineering

Lane L. Clarke, DVM, PhD: Associate Professor of Veterinary Biomedical Sciences

J. Thomas Cunningham, PhD: Assistant Professor of Physiology

Joseph L. Dixon, PhD: Research Associate Professor, Dalton Cardiovascular Research Center

Kevin D. Gillis, DSc: Assistant Professor of Electrical Engineering and of Physiology

Calvin C. Hale, PhD: Associate Professor of Veterinary Biomedical Sciences

Marc Hamilton, PhD: Assistant Professor of Veterinary Biomedical Sciences

Eileen M. Hasser, PhD: Associate Professor of Veterinary Biomedical Sciences

Meredith Hay, PhD: Associate Professor of Veterinary Biomedical Sciences; Director, Center for Gender Physiology and Environmental Adaptation, University of Missouri School of Medicine

Cheryl M. Heesch, PhD: Associate Professor of Veterinary Biomedical Sciences
Virginia H. Huxley, PhD: Professor of Physiology

Tzyh-Chang Hwang, PhD: Associate Professor of Physiology

Allan W. Jones, PhD: Associate Director, Dalton Cardiovascular Research Center; Professor and Chair of Physiology

Joe N. Kornegay, DVM, PhD: Professor and Dean of the College of Veterinary Medicine

M. Harold Laughlin, PhD: Professor and Chair of Veterinary Biomedical Sciences, Professor of Physiology

Mark A. Milanick, PhD: Professor of Physiology

Elmer M. Price, PhD: Associate Professor of Veterinary Biomedical Sciences

Michael J. Rovetto, PhD: Professor of Physiology

Leona Rubin, PhD: Associate Professor of Veterinary Biomedical Sciences

James C. Schadt, PhD: Associate Professor of Veterinary Biomedical Sciences

Arnold L. Smith, MD: Professor and Chair of Molecular Microbiology and Immunology

Ronald L. Terjung, PhD, Dhc: Professor and Associate Chair, Veterinary Biomedical Sciences

Richard Tsika, PhD: Associate Professor of Veterinary Biomedical Sciences and of Biochemistry

Xiaozin Zou, PhD: Research Assistant Professor, Dalton Cardiovascular Research Center and Department of Biochemistry
Research Areas

**Biomedical Engineering**
Investigators: Chen, Gillis, Huxley, Hwang, Jones, Milanick, Rubin, Sullivan, Zou

**Cardiovascular Imaging**
Investigators: Chen

**Cystic Fibrosis**
Investigators: Clarke, Hwang, Milanick, Price, Smith

**Exercise/Inactivity Including Atherosclerosis, Muscle Biology, Obesity, Type II Diabetes, and Vascular Biology**

**Membrane Transport**
Investigators: Clark, Gillis, Hale, Huxley, Hwang, Milanick, Price, Rovetto, Rubin, Zou

**Muscular Dystrophy**
Investigators: Kornegay

**Nephrology Including Hypertension, Renal Failure, Diabetic Nephrology, and Peritoneal Dialysis**
Investigators: Blaine, Dale, Khanna, Nolph, Twardowski

**Neurohumoral Control of the Circulation Including Hypertension, Heart Failure, and Salt and Water Homeostasis**
Investigators: Blaine, Cunningham, Hasser, Heesch, Hay, Milanick, Price, Schadt, Sullivan
Funding

### Year 2001 Investigator Funding

<table>
<thead>
<tr>
<th>Type</th>
<th>Amount</th>
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<td>Grant Funds – Direct Costs</td>
<td>$8,314,038</td>
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<td>Grant Funds – Indirect Costs</td>
<td>$2,552,585</td>
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<td>Fellowships – Direct Costs</td>
<td>$350,603</td>
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<td>Total Funding</td>
<td>$11,217,226</td>
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### Year 2001 Funding Distribution

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<th>Type</th>
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<tr>
<td>Resident Investigators Direct Costs</td>
<td>$4,355,573</td>
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<tr>
<td>Resident Shared Credit Direct Costs</td>
<td>$137,178</td>
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<tr>
<td>Non-resident Investigators Direct Costs</td>
<td>$4,171,890</td>
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<tr>
<td>Total Direct Costs (Includes Fellowships)</td>
<td>$8,664,641</td>
</tr>
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</table>

### Year 2001 Sources of Funding

- **National Institutes of Health**: 79%
- **NASA**: 3%
- **NSF**: 3%
- **CFF**: 3%
- **HRSA**: 5%
- **Other**: 7%
Principal Investigator Research Grants  
(Year 2001 Total Costs)

American Heart Association

“Central Cardiovascular Control During Blood Loss” James Schadt $38,251

“Role of Ubiquitin-Proteasome Pathway in Vascular Wall Metabolism and Atherosclerosis” Joseph Dixon $39,976

Association Françoise contre les Myopathies

“Cellular Effects of Prednisone Treatment in Canine Dystrophy” Joe Kornegay $35,802

Baylor College of Medicine

“Role of Growth Hormone Secretogogues and Exercise on Muscle Homeostasis under Microgravity” Frank Booth $67,131

Chiron Corporation


Cystic Fibrosis Foundation

“Intramolecular Regulation of CFTR” Elmer Price $60,000

“NBF1 and Restoration of Anion Secretion in F508 Cells” Lane Clarke $42,958

“Role of Human Beta-Defensin-2 in Cystic Fibrosis Bronchitis” Arnold Smith $93,920

Health Resources and Services Administration

“Dalton Cardiovascular Research Center Construction/Renovation” Edward Blaine $610,257

Muscular Dystrophy Association

“Cellular Effects of Prednisone Treatment in Canine Dystrophy” Joe Kornegay $101,364
**NASA**

“Genomics of Human Skeletal Muscle During Bedrest & Exercise” (administered by Baylor College of Medicine) Marc Hamilton $120,012

“Mobile Wireless Access to Low Resolution Picture Taking (LRPT) NOAA Weather Images” Chang Wen Chen $50,000

“Signaling of Muscle Atrophy with Unloading” Frank Booth $157,611

“Vascular Control of Skeletal Muscle Blood Flow After Simulated Microgravity” Harold Laughlin $22,000

**National Institutes of Health**

“Adenine Nucleotide Metabolism in Skeletal Muscle” Ronald Terjung $324,551

“Altered Mechanical Loads and Skeletal Muscle Phenotype” Richard Tsika $340,750

“Angiogenic Growth Factors in Exercising Skeletal Muscle” Ronald Terjung $35,315

“Baroreceptor Neurons - Metabotropic Receptor Modulation” Meredith Hay $95,400

“Ca Sensing for Exocytosis” Kevin Gillis $181,250

“Cardiovascular and Renal Physiology, Pharmacology and Biochemistry” Virginia Huxley $195,680

“Cardiovascular Regulation-Hindlimb Unweighted Animals” Eileen Hasser $231,995

“Central Cardiovascular Control During Blood Loss” James Schadt $253,750

“CFTR and Duodenal Anion Transport” Lane Clarke $217,500

“Circumventricular Organs: Gender & Hypertension” Meredith Hay $250,415

“Control of Sodium Intake in the Hindlimb Unweighted Rat” Thomas Cunningham $198,585

“Conversion of Shell Space -- Dalton Cardiovascular Research Center” Edward Blaine $518,000
“Cystolic Modulation of Plasma Membrane Ion Transport” Mark Milanick $206,755
“Exercise and Coronary Adenosine Activated K Currents” Douglas Bowles $93,468
“Exercise Hypertrophy and Control of Myosin Induction” Richard Tsika $152,026
“Exercise Training and Peripheral Arterial Insufficiency” Ronald Terjung $362,500
“Exercise-Induced Growth of Skeletal Muscle” Frank Booth $204,450
“Failed Rescue of Old Skeletal Muscle from Atrophy” Frank Booth $263,000
“Gating of the CFTR C1 Channel by ATP Hydrolysis” Tzyh-Chang Hwang $253,750
“Hypertension Mechanisms and Vascular Ion Exchange” Allan Jones $215,742
“Invasive Noncapsulated H. Influenza” Arnold Smith $290,000
“Metabotropic Glutamate Receptors and Baroreflex Function” Eileen Hasser $279,326
“Molecular Aspects of Microbial Pathogenesis” Arnold Smith $175,526
“Molecular Pathophysiology of Cystic Fibrosis” Tzyh-Chang Hwang $209,633
“Neural Regulation of Vasopression Release” Thomas Cunningham $181,250
“Neural Systems Regulating Vasopressin Release” Thomas Cunningham $67,500
“Ovarian Hormone Metabolites and Neural Circulatory Control” Cheryl Heesch $164,388
“Proteomics: Inactivity-induced Muscle Insulin Resistance” Frank Booth $72,500
“Regulation of Baroreceptor Afferent Transmission” Meredith Hay $151,719
“Regulation of Single Capillary Permeability Properties” Virginia Huxley $200,979
“Regulation of the Secretion of ApoB-Lipoprotein” Joseph Dixon $253,750
“Role of Angiotensin II in Skeletal Muscle Hypertrophy” Frank Booth $13,188
“Running Induced Increase in Muscle LPL mRNA” Marc Hamilton $219,544
“Satellite Stem Cell Biology” Frank Booth $181,604

“Training: Muscle Blood Flow and Capillary Dynamics” Harold Laughlin $237,738

“Vascular Biology: Exercise Training and Coronary Disease” Harold Laughlin $1,526,811

**National Science Foundation**

“Cellular Electrophysiology on a Chip” Kevin Gillis $280,516

**Parent Project, Muscular Dystrophy**

“Investigative Therapeutics in a Canine Model of Duchenne Muscular Dystrophy” Joe Kornegay $105,332

**Proctor & Gamble**

“VEGF-Mediated Collateral Blood Flow” Ronald Terjung $42,860

**University of Missouri Research Board**

“Energetics of Ligand-Protein Interaction” Xiaoqin Zou $49,926
Fellowships

**American Heart Association**

“Mutation of the XIP Domain of the Cardiac-Sodium Exchanger”  Julie Bossuyt  
(Calvin Hale, sponsor) $28,000

“Regulation of the Electroneutral Salt and Water Absorption in Intestinal Epithelium”  
Lara Gawenis (Lane Clarke, sponsor) $16,000

**American Physiological Association**

“Regulation of Lipoprotein Lipase mRNA by the 3’ Untranslated Region”  Grady Campbell (Frank Booth, sponsor) $28,912

**Cystic Fibrosis Foundation**

“A Novel Model and System for Studying CFTR Processing”  Stacie Raymond  
(Elmer Price, sponsor) $37,600

“Ion Transport Deregulation in the Murine CF Intestine, Study of Sodium Chloride Absorption”  Xavier Stien (Lane Clarke, sponsor) $37,600

“Molecular Biophysics of the CFTR Channel Pore”  Zhen Zhou (Tzyh-Chang Hwang, sponsor) $36,500

**National Institutes of Health**

“Central Mechanisms of Area Postrema Sympathoinhibition”  Patrick Mueller (Eileen Hasser, sponsor) $45,560

“Changes in Angiogenic Growth Factor Content and Expression”  Pam Lloyd  
(Ronald Terjung, sponsor) $35,315

“Remodeling of Collateral Vessels after Femoral Artery Occlusion”  Barry Prior  
(Ronald Terjung, sponsor) $50,116

**United Negro College Fund**

“Regulation of CFTR Gating by cAMP-Dependent Protein Kinase Phosphorylation”  
Allan Powe (Tzyh-Chang Hwang, sponsor) $35,000
# Postdoctoral Fellows

<table>
<thead>
<tr>
<th>Fellow</th>
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<tbody>
<tr>
<td>Tomohiko Ai</td>
<td>Dr. Tzyh-Chang Hwang</td>
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<tr>
<td>Physiology</td>
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<tr>
<td>Layla Al-Nakkash</td>
<td>Dr. Leona Rubin</td>
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<tr>
<td>Veterinary Biomedical Sciences</td>
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<tr>
<td>Ranan Aktas</td>
<td>Dr. Joseph Dixon</td>
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<td>Biological Sciences</td>
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<td>Lionel Bey</td>
<td>Dr. Marc Hamilton</td>
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<tr>
<td>Silvia Bompadre</td>
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<td>Julie Bossuyt</td>
<td>Dr. Calvin Hale</td>
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<td>Casey Childers</td>
<td>Dr. Joe Kornegay</td>
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<td>Arvinder Dhalia</td>
<td>Dr. Leona Rubin</td>
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<td>Zhiqiang Fan</td>
<td>Dr. Frank Booth</td>
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<td>Charles Foley</td>
<td>Dr. Cheryl Heesch and Dr. Eileen Hasser</td>
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<td>Lara Gawenis</td>
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<td>Scott Gordon</td>
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<td>Cristine Heaps</td>
<td>Dr. Douglas Bowles</td>
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<td>Hyunsik Kang</td>
<td>Dr. Marc Hamilton</td>
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<tr>
<td>Natalia Karasseva</td>
<td>Dr. Richard Tsika</td>
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<tr>
<td>Veterinary Biomedical Sciences</td>
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</table>
Lyudmyla Kvochina  
Veterinary Biomedical Sciences  
Dr. Cheryl Heesch

Zeyi Li  
Veterinary Biomedical Sciences  
Dr. Ronald Terjung

Mingxiang Liao  
Veterinary Biomedical Sciences  
Dr. Richard Tsika

Hao-Yang Liu  
Dalton Cardiovascular Research Center  
Dr. Xiaoqin Zou

Jocelyn Liu  
Veterinary Biomedical Sciences  
Dr. Joe Kornegay

Pam Lloyd  
Veterinary Biomedical Sciences  
Dr. Ronald Terjung

Chun-Min Lo  
Dalton Cardiovascular Research Center  
Dr. Joseph Dixon

Shuichi Machida  
Veterinary Biomedical Sciences  
Dr. Frank Booth

Carol Okamura  
Veterinary Biomedical Sciences  
Dr. Joe Kornegay

Jayabala Pamidimukkala  
Veterinary Biomedical Sciences  
Dr. Meredith Hay

Allan Powe  
Physiology  
Dr. Tzyh-Chang Hwang

Barry Prior  
Veterinary Biomedical Sciences  
Dr. Ronald Terjung

Stacie Raymond  
Dalton Cardiovascular Research Center  
Dr. Elmer Price

Jie Ren  
Veterinary Biomedical Sciences  
Dr. Ronald Terjung

James Rush  
Veterinary Biomedical Sciences  
Dr. Elmer Price

Espen Spangenburg  
Veterinary Biomedical Sciences  
Dr. Frank Booth

Xavier Stien  
Dalton Cardiovascular Research Center  
Dr. Lane Clarke

Dharmesh Vyas  
Veterinary Biomedical Sciences  
Dr. Frank Booth
Graduate Students

<table>
<thead>
<tr>
<th>Student</th>
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<tbody>
<tr>
<td>Kirk Abraham</td>
<td>Dr. Ronald Terjung</td>
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<td>Aaron Aaker</td>
<td>Dr. Harold Laughlin</td>
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<td>Bhavani Akunuri</td>
<td>Dr. Marc Hamilton</td>
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<td>Computer Science</td>
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<td>Kathryn Arns</td>
<td>Dr. Lane Clarke</td>
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<td>Jeffrey Brault</td>
<td>Dr. Ronald Terjung</td>
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<td>Peng Chen</td>
<td>Dr. Kevin Gillis</td>
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<td>Electrical Engineering</td>
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<td>Xiaohui Chen</td>
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<td>James Dunning</td>
<td>Dr. Kevin Gillis</td>
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<td>Chad Hancock</td>
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<td>Caroline Hoang</td>
<td>Dr. Meredith Hay</td>
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<td>Veterinary Biomedical Sciences</td>
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<tr>
<td>Name</td>
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<tr>
<td>Sonia Houston</td>
<td>Physiology</td>
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<td>David Kump</td>
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<td>J. Scott Pattison</td>
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<td>Bill Schrage</td>
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<td>Heidi Shafford</td>
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<td>JianJie Wang</td>
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# Undergraduate Students

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<tr>
<td>Beth Baumann</td>
<td>Dr. Marc Hamilton</td>
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<tr>
<td>Tony Cova</td>
<td>Dr. Lane Clarke</td>
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<tr>
<td>Cathy Galle</td>
<td>Dr. Douglas Bowles</td>
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<td>Amanda Holferty</td>
<td>Dr. Kevin Gillis</td>
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<tr>
<td>Chirag Parghi</td>
<td>Dr. Marc Hamilton</td>
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<tr>
<td>Andrea Sano</td>
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<tr>
<td>Bonnie Taylor</td>
<td>Dr. Calvin Hale</td>
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<tr>
<td>Chris Wheatley</td>
<td>Dr. Marc Hamilton</td>
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<tr>
<td>Andrew Wheeler</td>
<td>Dr. Leona Rubin</td>
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# High School Students

<table>
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<tr>
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<tbody>
<tr>
<td>Mariam Eldeib</td>
<td>Dr. Joseph Dixon</td>
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<tr>
<td>Jonathan Tan</td>
<td>Dr. Kevin Gillis</td>
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<tr>
<td>Shengxin Sun</td>
<td>Dr. Virginia Huxley</td>
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</table>
Seminar Series

“Heterogeneous Distribution of Receptors on Autonomic Neurons”
Sue Aicher, PhD
Neurological Sciences Institute,
Oregon Health Sciences University

“The Journey of the Iodide Transporter (NIS): From its Molecular Identification to its Role in Breast Cancer”
Nancy Carrasco, MD
Department of Molecular Pharmacology,
Albert Einstein College of Medicine

“The Intracellular Journey of the GLUT4 Glucose Transporter in Muscle Cells”
Amira Klip, PhD
Programme in Cell Biology,
Hospital for Sick Children

“Formation and Assembly of an Archaeal Rhodopsin”
Mark P. Krebs, PhD
Division of Biological Sciences,
Illinois State University

“Studies with New Markers of the Cellular Mechanisms Behind Muscle Regeneration”
Terence Partridge, PhD
MRC Muscle Cell Biology Group,
Imperial College School of Medicine
“Modulation of the Calcium Signal Transducer Troponin C: Effects on Contraction and Relaxation in Skeletal Muscle”
Jack Rall, PhD
Department of Physiology and Cell Biology,
Ohio State University

“Gap-Junctional Hemichannels: Do They Play a Role in Cell Death”
Luis Reuss, MD
Department of Physiology and Biophysics,
University of Texas Medical Branch

“Glucocorticoids and Neural Control of the Circulation”
Deborah Scheuer, PhD
Division of Pharmacology,
University of Missouri-Kansas City

“Molecular Regulation of Phospholamban Function and Expression in Cardiac Sarcoplasmic Reticulum”
Michihiko Tada, MD, PhD
Department of Medicine and Pathophysiology,
Osaka University Medical School

“Alterations in Risk Factors for Cardiovascular Disease and Diabetes in Exercise Training: The Heritage Family Study”
Jack Wilmore, PhD
Department of Health and Kinesiology,
Texas A&M University
Abstracts

Booth

Bowles

Clarke


Cunningham


Dixon
Dixon, J. L., Otis, C., Fang, J., Lee, D. L , Bilhorn, K., Laughlin, M.H. and Sturek, M. One high fat meal per day leads to a more atherogenic lipoprotein profile than twice per day feeding. FASEB J. 15(4):A395, 2001


Gillis


Hale


Hamilton


Hasser


R.R. Grindstaff, E.M. Hasser, and J.T. Cunningham. Activation of Supraoptic Vasopressin Neurons by Baroreceptor Unloading is Attenuated Following
Hindlimb Unloading. FASEB J. 2001
Heesch, CM, Mueller PJ, Foley CM and Hasser EM. Gender Effects on Autonomic Responses to Cardiovascular Deconditioning. FASEB J. 2002
Mueller, PJ, Cunningham JT, Grindstaff RR, Laughlin MH, Hasser EM. Hypotension-Induced Fos Expression in the Hypothalamus of Endurance Trained Rats. FASEB J. 2002

Hay

Heesch
Foley, C.M., R.L. Ashmore, E.M. Price, E.M. Hasser, C.M. Heesch. GABA<sub>A</sub> Receptor \(\alpha_1\) and \(\alpha_2\) Protein Expression in Rostral Ventrolateral Medulla in Nonpregnant and Pregnant Rats. Submitted to FASEB Journal, 2002.


**Huxley**


Huxley, V.H. 2001. Influences of gender and training on coronary vascular permeability (P<sub>s</sub>) to proteins. XXIV IUPS Congress, Christ Church, NZ.

Bingaman, S. and V.H. Huxley, 2001 The properties of albumin: a comparison of species and the influence of fluorescent dye labeling. XXIV IUPS Congress, Christ Church, NZ.


Houston S. and V.H. Huxley, 2001. 17-ß Estradiol Induced Changes in Amphibian Hydraulic Conductivity XXIV IUPS Congress, Christ Church, NZ


**Hwang**


Milanick


Washburn, B. E., Joshua J. Millspaugh, Mark A. Milanick, Jeff Beringer, Lonnie Hansen, and Alex J. Bermudez. Noninvasive measurement of stress in cervids. Poster Presentation at the 2001 University of Missouri Molecular Biology Week, March 2001

Millspaugh, J. J. Brian E. Washburn, Tamara M. Meyer, Brita E. Woeck, Chadwick D. Rittenhouse, Jeff Beringer, Lonnie Hansen, Alex J. Bermudez, and Mark A.
Milanick. Noninvasive measurement of stress in white-tailed deer, Abstract published and paper presented at the 2001 Southeast Deer Study Group meeting February 2001


Rovetto


Rubin


Schadt


Terjung

Zou
Xiaoqin Zou, Min Li and Tzyh-Chang Hwang. Homology modeling of the NBD1-NBD2 complex structure of the CFTR using the crystal structures of other ABC transporter proteins, Biophysical Journal, 82, 533a, 2002.
Journal Articles

**Booth**


**Bowles**


Clarke


Clarke, LL, and Harline, MC. CFTR and HCO3\(^-\)-Dependent Cl\(^-\) Secretion Across Murine Proximal Duodenum. Am. J. Physiol. (Submitted).


Cunningham


Dixon
Peluso, M.R. and Dixon, J. L. Use of 2-hydroxypropyl-β-cyclodextrin to study cholesterol metabolism in HepG2 cells. II. Cyclodextrin-mediated cholesterol efflux stimulates cholesterol biosynthesis from either acetate or octanoate. (In revision).

Gillis

Hale
Hamilton


Bey L., Noe L., Arnault F., Dabit D., Maigret P., and Hamilton M.T. Atorvastatin, a new HMG-CoA reductase inhibitor, increases lipoprotein lipase mRNA level in 3T3-L1 preadipocytes. Pharmacology (Accepted 1/30/02)


Hasser

Schadt JC and Hasser EM. The defense reaction alters the response to blood loss in the conscious rabbit. Am. J. Physiol. (Regulatory Integrative Comp. Physiol.) 280:R985-R993, 2001


Mueller PJ, Foley CM, Vogl HW, Hay M and Hasser EM. Response to Group III mGluR Activation in NTS does not Involve Actions at Glycine Sites on NMDA Channels. Submitted to Am. J. Physiol. (Heart Circ. Physiol.)

Moffitt JA, Heesch CM and Hasser EM Increased GABA_A Inhibition of the RVLM Following Hindlimb Unloading in Rats. In Press Am. J. Physiol. (Regulatory Integrative Comp. Physiol.)

Hay


Heesch


Huxley

Rumbaut, R.E., and V.H. Huxley, Similar permeability responses to nitric oxide synthase inhibitors of venules from three animal species. In press, Microvascular Research

Hwang


Jones


Kornegay

Laughlin

Milanick
Nancy T. Ruddock, Krista L. Arnett, Betty Jo Wilson, and Mark A. Milanick. Ligands alter the ability of chloro(2,2':6',2"-terpyridine) platinum to inhibit the renal Na+,K+ ATPase. Am. J. Physiol. Cell Physiol. (In revision.)

Price

Rovetto

Rubin

Schadt
Schadt, J.C. and Hasser, E.M. The defense reaction alters the response to blood loss in the conscious rabbit. Am.J.Physiol. 280 (Regulatory Integrative Comp.


Tsika


Zou


Xiaoqin Zou, Min Li, and Tzyh-Chang Hwang. A Dimeric Structural Model of the Nucleotide Binding Domains of the CFTR Based on the Crystal Structures of MalK and HisP. To be submitted to Biochemistry.
Books and Book Chapters

Rubin


Terjung

Patents

Hale
Large Scale Expression and Purification of Recombinant Proteins, U.S. Patent Application Serial Number 09/901,419 filed July 9, 2001
Awards, Honors and Offices

Blaine
Leadership in Cardiovascular Research, American Heart Association
Award for Excellence in Medical Education, University of Missouri-Columbia

Booth
Associate Editor, *Journal of Applied Physiology*
Editorial Board, *American Journal of Physiology: Cell Physiology*
Board Member of Research Group on the Biochemistry of Exercise

Cunningham
Award for Excellence in Medical Education, University of Missouri-Columbia, 2001.
Editorial Board for *American Journal of Physiology: Heart and Circulatory Physiology*
Editorial Board for American Journal of Physiology: Regulatory, Integrative and Comparative Physiology

Hamilton
Stevens Professor, University of Florida
Editorial Board, Journal of Applied Physiology

Hasser
American Physiological Society Travel Award
Associate Editor, Am. J. Physiol. Heart Circ. Physiol.

Hay
Editorial Board, Am. Journal of Physiology, Heart

Heesch
Editorial Board, American Journal of Physiology: Heart and Circulatory Physiology
Consulting Editor, American Journal of Physiology: Heart and Circulatory Physiology

Huxley
Hugh Stephenson Award – Research, American Heart Association-Heartland Affiliate

Hwang
Service Award, American Medical Student Association, University of Missouri
Order of Socrates, MU Medical School

Laughlin
Editorial Board, Journal of Applied Physiology
Associate Editor Medicine & Science in Sports & Exercise

Milanick
Editorial Board: Journal of Membrane Biology
Rubin
Editorial Board, Shock
Honorary Member, Phi Zeta Veterinary Honor Society

Schadt
Faculty Performance Shares, Recognition for teaching contributions, University of Missouri
Editorial Board, American Journal of Physiology: Heart and Circulatory Physiology
Editorial Board, Journal of Applied Physiology

Smith
Robert Gans Professorship, Massachusetts General Hospital
Journal of Infectious Disease

Terjung
Chair, Organizing Committee, American Physiological Society Conference: The Integrative Biology of Exercise IV
Advisory Committee, August Krogh Institute, University of Copenhagen
IUPS Commission on Work and Exercise Physiology
Editorial Board, Journal of Applied Physiology
Editorial Board, Medicine and Science In Sports and Exercise

Tsika
Editorial Board, Journal of Applied Physiology

Zou
FASEB MARC Program Travel Award
Peer Review

Booth
Research Task Force, American College of Sports Medicine
Health & Science Policy Committee, American College of Sports Medicine
Planning Committee of Normative Measures of Musculoskeletal Fitness, NIH Workshop
Member International Union of Physiological Sciences commission on Work and Exercise Physiology

Bowles
Reviewer, Cardiovascular Research
Reviewer, American Journal of Veterinary Research
Reviewer, Circulation Research
Reviewer, Journal of Applied Physiology
Reviewer, American Journal of Physiology: Heart and Circ. Physiology
Reviewer, Medicine & Science in Sports & Exercise
Member, American Heart Association CV Regulation II Peer Review Study Group

Clarke
Reviewer, American Journal of Physiology: Gastrointestinal and Liver Physiology
Reviewer, Journal of General Physiology
Reviewer, American Journal of Respiratory Cell and Molecular Biology
Grant Reviewer, Cystic Fibrosis Foundation
Grant Reviewer, National Institutes of Health Medical Biochemistry Study Section, Ad Hoc

Cunningham
Member of American Physiological Society Standing Committee for Education.
Reviewer, Hypertension
Reviewer, Brain Research
Reviewer, Brain Research Bulletin
Reviewer, Circulation Research

Dixon
Metabolism Study Section, Nutrition and Metabolic Sciences Integrated Review Group
Reviewer, Journal of Lipid Research
Reviewer, Journal of Biological Chemistry
Reviewer, Biochimica et Biophysica Acta
Reviewer, Atherosclerosis

Gillis
Reviewer, Nature
Reviewer, Science
Reviewer, Neuron
Reviewer, EMBO Journal
Reviewer, Biophysical Journal
Reviewer, Journal of Theoretical Biology
Reviewer, Journal of Neuroscience
Grant Reviewer, NIH, Ad Hoc
Grant Reviewer, NSF, Ad Hoc
Grant Reviewer, UM Research Board

Hale
Reviewer, American Heart Association – Great American Consortium
Reviewer, Biochimica et Biophysica Acta

Hamilton
Reviewer, Physiological Genomics
Reviewer, Journal of Applied Physiology
Reviewer, Medicine & Science in Sports & Exercise
Reviewer, Journal of Molecular and Cellular Cardiology,
Grant Reviewer, University of Missouri Research Board

Hasser
Reviewer, American Journal of Physiology (Heart Circ. Physiol.)
Reviewer, American Journal of Physiology (Reg. Integ. Physiol.)
Reviewer, Brain Research
Reviewer, Canadian Journal of Physiology and Pharmacology
Reviewer, Hypertension
Reviewer, Journal of Applied Physiology
Reviewer, Journal of Physiology
Reviewer, Journal of the Autonomic Nervous System
Reviewer, Medicine and Science in Sports and Exercise
Grant Review Board, American Heart Association, Heartland Section
NIH Program Project Grant Special Review Committee

Hay
Chair, Study-Section, CV-Reg. 1, AHA National Center
Reviewer, American Journal of Physiology, Heart and Circulation
Reviewer, American Journal of Physiology, Regulatory, Integrative
Reviewer, Hypertension
Reviewer, Journal of Neurophysiology
Reviewer, Brain Research
Reviewer, Journal of Autonomic Nervous System
Reviewer, Journal of Applied Physiology
Member, Ad-Hoc NIH Study Section, ECS
Grant Review, Midwest Regional, American Heart Association
Heesch
Reviewer, Journal of Applied Physiology
Reviewer, American Journal of Physiology
Reviewer, Journal of Applied Physiology

Huxley
Reviewer, American Journal of Physiology: Heart & Circulation; Cell; Regulatory, Integrative & Comparative; Endocrine & Metabolism
Reviewer, Circulation Research
Reviewer, Biorheology
Reviewer, Biophys. Biochem. Acta
Reviewer, Journal of Applied Physiology
Reviewer, Journal of Physiology (London)
Reviewer, Annals of Biomedical Engineering
Reviewer, Hypertension
Reviewer, Journal of the American Society of Nephrology
Reviewer, Proceedings of the National Academy of Sciences (US)
NIH DDK Special Study Section

Hwang
Reviewer, American Journal of Physiology (cell physiology)
Reviewer, American Journal of Physiology (heart and circulation)
Reviewer, Journal of General Physiology
Reviewer, Neuron
Reviewer, Journal of Membrane Biology
Reviewer, Journal of Biological Chemistry
Reviewer, Journal of Pharmacology and Experimental Therapeutics
Reviewer, Journal of Molecular and Cellular Cardiology
Reviewer, Canadian Journal of Physiology and Pharmacology
Reviewer, Biophysical Journal
Reviewer, Journal of Physiology
Grant Review, Cystic Fibrosis Trust
Grant Review, Cystic Fibrosis Foundation
Grant Review, Cystic Fibrosis Research Inc.
Grant Review, MU Research Board
Grant Review, Veteran Affairs
Grant Review, NIH (CVA, special reviewer), NIH (GMB, ad hoc member).

Kornegay
Ad Hoc Reviewer, Journal of the American Veterinary Medical Association
Ad Hoc Reviewer, Journal of the American Animal Hospital Association
Ad Hoc Reviewer, Journal of Neurological Sciences,
Ad Hoc Reviewer, Neuromuscular Diseases
Ad Hoc Reviewer, Journal of Veterinary Internal Medicine
Laughlin
Reviewer, Avia. Space Environ. Med
Reviewer, J. Applied Physiol
Reviewer, Med. Sci. Sports Exercise
Reviewer, Am. J. Physiol.
Reviewer, Hypertension
Reviewer, Blood Vessels
Reviewer, Microvascular Research
Reviewer, Circulation
Reviewer, Circulation Research
Reviewer, Microcirculation
Grant Review, National Institutes of Health, NRSA Review Panel

Milanick
Reviewer, American Journal of Physiology: Cell Physiology
Reviewer, Biochimica Biophysica Acta: Biomembranes
Reviewer, Biophysics Journal
Reviewer, Journal of Biological Chemistry
Reviewer, Journal of General Physiology
Reviewer, Journal of Membrane Biology
Reviewer, Journal of Theoretical Biology
Reviewer, Science

Price
Reviewer, Molecular Pharmacology
Reviewer, Biochimica et Biophysica Acta
Reviewer, Biochemistry
Reviewer, Journal of Applied Physiology
Grant Review, American Heart Association Midwest Affiliate Consortium

Rovetto
Reviewer, American Journal of Physiology
Reviewer, AHJ
Reviewer, Circulation
Reviewer, Circulation Research
Reviewer, Cardiovascular Research
Reviewer, Circulation Research

Rubin
Reviewer, American Journal of Physiology, Heart and Circulatory Physiology
Reviewer, Cell and Integrative Physiology
Reviewer, Journal Molecular and Cellular Cardiology
Reviewer, Shock
Schadt
Reviewer, American Journal of Physiology: Heart and Circulatory Physiology
Reviewer, Journal of Applied Physiology
Reviewer, American Journal of Physiology: Regulatory, Integrative and Comparative Physiology
Reviewer, American Journal of Physiology: Physiological Genomics
Reviewer, Medicine and Science in Sports and Exercise
Grant Reviewer, American Heart Association, National (Cardiovascular Regulation II Study Group)
Grant Reviewer, American Osteopathic Association
Grant Reviewer, U.S. Army (Coordinated through AIBS)

Smith
Ad Hoc Reviewer, Medical Research Council of Canada
Ad Hoc Reviewer, National Sciences Foundation
Ad Hoc Reviewer, Cystic Fibrosis Foundation of Canada
Ad Hoc Reviewer, Thrasher Foundation
NIH Peer Review Oversight Group (PROG)
NIH working group on Regulatory Burden and Conflict of Interest

Tsika
Reviewer, Journal of Biological Chemistry
Reviewer, Molecular and Cellular Cardiology
Reviewer, European Journal of Biochemistry
Reviewer, Developmental Genetics
Reviewer, American Journal of Physiology (Reg., Integ., Comp.)
Reviewer, American Journal of Physiology (Cell Physiology)
Reviewer, American Journal of Physiology (Heart and Circulatory Physiology)
Presentations and Lectures

**Bowles**
7th World Congress for Microcirculation, Sydney, Australia; August, 2001
Medical College of Georgia, Vascular Biology Center, January, 2002.
University of Missouri, Dept. of Physiology; November, 2001.

**Clarke**
Acid-Base transporters in the CFTR-null intestine. Department of Physiology.
University of Southern Alabama, Mobile, AL. April 18, 2002.

**Cunningham**
2001 Invited Speaker for American Society of Physiology Refresher Course on Integrating Endocrinology into Modern Medical School Curricula.
Cardiovascular Regulation of Supraoptic Vasopressin Neurons. World Congress on Neurohypophysial Hormones, September 2001, Bordeaux, France

**Dixon**
The Plasma Lipoprotein Profile is an Important Factor in Development of Atherosclerosis in Diabetic Hyperlipidemic Swine. University of Missouri, Cardiovascular Day VIII, February 12, 2001
Enhanced Atherosclerosis in Diabetic Hyperlipidemic Swine: Role of Lipoproteins. Case Western Reserve University, Department of Nutrition, Cleveland, Ohio, February 26, 2001
Development of Coronary Artery Atherosclerosis in Diabetic Dyslipidemic Swine: Role of Intermediate Density Lipoproteins. Department of Endocrinology, Washington University School of Medicine, St. Louis, MO, May 31, 2001
Rapid Development of Coronary Artery Atherosclerosis in Diabetic Hyperlipidemic Swine: Role of Intermediate Density Lipoproteins. Department of Medicine, College of Physicians and Surgeons, Columbia University, New York, NY, June 18, 2001
Coronary Artery Atherosclerosis in Diabetic Dyslipidemic Swine: A Model for Coronary Disease in Diabetic Humans. Department of Anatomy and Cell Biology, SUNY Downstate Medical Center, Brooklyn, NY, June 20, 2001
ApoB Transport in the Secretory Pathway-Studies with Confocal Microscopy. 10th Southeast Lipid Research Conference, Callaway Gardens, GA. October 4-7, 2001
Hepatic Free Cholesterol is Highly Correlated with Coronary Atheroma in Diabetic Dyslipidemic Pigs. University of Missouri, Cardiovascular Day IX, February 4, 2002
Gillis
“A method for measuring membrane capacitance during cell depolarization”, Max Planck Institute for Biophysical Chemistry, Dept. of Membrane Biophysics, Goettingen, Germany, 07/2001
“The relationship between cAMP, Ca^{2+}, and transport of CFTR to the plasma membrane”, Oregon Health Sciences University, Vollum Institute, Portland, OR, 02/2002
“The relationship between cAMP, Ca^{2+}, and transport of CFTR to the plasma membrane”, Case Western Reserve University, Dept. of Physiology, Cleveland, OH, 03/2002

Hale
/Cardiac Sodium-Calcium Exchange: Structural and Functional Studies Using a Novel Expression System". Department of Pharmacology, School of Medicine, University of Brussels (VUB), Brussels, Belgium, April 2001.
“The Cardiac Sodium-Calcium Exchanger Associates with Caveolin-3” APS Conference, Banff, Alberta, Canada, 2001
"Cardiac Sodium-Calcium Exchange: Large-Scale Expression and Possible Role in Transmembrane Signaling". Department of Physiology and Biophysics, Finch University of Health Sciences, The Chicago Medical School, Chicago, IL, January 2002.

Hamilton
Cardiovascular Day, University of Missouri-Columbia, February 2001
University of Texas Medical School, Houston, TX, March 2001
Experimental Biology 2001, Orlando, Fl, April 2001
American College of Sports Medicine, Baltimore, MD, May 2001
University of Florida, Gainesville, FL, December 2001
National Space Biomedical Research Institute, Montgomery, TX, January 2002

Hasser
Hot Topics in Neurohumoral Control of Homeostatic Function; Altered neurohumoral control in Cardiovascular Deconditioning, 2001
International Union of Physiological Societies; Effects of Deconditioning on Vasopressin Secretion, 2001

Hay
Heesch
Univ. of Missouri, First Annual Missouri Symposium on Women’s Health Research. “Cardiovascular Regulation and Pregnancy” May 2001
Univ. of Missouri – KC, School of Pharmacy/ Kansas City, MO. “CNS Effects of Ovarian Hormones on Cardiovascular Regulation” March 2002
Experimental Biology ’02/ Symposium Organizer/ Amer. Physiol. Soc./ Refresher Course in Neuroscience April 2002

Huxley
World Congress of Microcirculation meeting in Sydney Australia. 2001
Eli Lily and Company, Cardiovascular Toxicology Division, “Physiological Adaptation of Microvascular Permeability” 2002
Department of Pharmacology and Physiology, University of Rochester School of Medicine “And We Thought We Knew How Microvascular Exchange Occurs” 2002
University of Rochester School of Medicine: Rochester, NY: Department of Pharmacology & Physiology "Despite what the Textbooks say Microvascular Barrier Properties Adapt to Changes in their Environment" 2002
University of Rochester Matrix Journal Club “Adaptation of the Microvascular Glycocalyx: a Mechanism Participating in the Regulation of the Microvascular Barrier to Water and Solute” 2002

Hwang
Department of Physics, Wuhan University, China
Department of Physiology and Biophysics, University of Colorado
Osaka Medical College
Department of Physiology, Kyoto University
Williamsburg Meeting
Department of Physiology and Biophysics, Cornell Medical College

Kornegay
Kornegay, JN: A canine model of DMD. Recent Advances in Animal Health and Production. Faculty of Veterinary Medicine, Universiti Putra Malaysia. Serdang, MALAYSIA, 2001.
Kornegay JN, Bogan JR, Bogan DJ, Okamura CS, Childers MK: Phenotypic variation in a canine model of DMD. Presented at the ceremony marking the opening of the canine facility at the National Center of Neurology and Psychiatry, Tokyo, JAPAN, 2001.

Laughlin
Laughlin MH: “Exercise-induced adaptations of endothelium and smooth muscle of coronary arteries.” Physiology Seminar, Department of Physiology, Creighton University, Medical Center, Omaha, NB February 21, 2001.


Laughlin MH: “Ethics and Cheating in Research: Is Science a dispassionate pursuit of truth?” TCACSM Lecture, and TAMU Christian Faculty Network lecture, Department of Health and Kinesiology, Texas A & M University, College Station, TX. October 9, 2001.

Laughlin MH: “Ethics and Cheating in Research: Is Science a dispassionate pursuit of truth?” TCACSM Lecture, Department of Kinesiology, Texas Women's University, Houston, TX. October 8, 2001.


Milanick

Pumping Ions: Trick or Treat? Southwest Missouri State University

Rubin


Myocardial Dysfunction of Sepsis and Endotoxemia: Early Changes in Calcium Channel Function. International Conference on Cardiovascular Pathophysiology and Drug Therapy of Cardiovascular Disorders. Punjabi University, Patiala, India.


Exercise, Hyperlipidemia and Gender: The Battle for Control of Coronary Artery Function. Department of Physiology, University of Nevada at Reno.
Schadt

Zou
DOCK Meeting: Applied Structure-Based Drug Design, San Francisco
Department of Physiology, University of Missouri-Columbia