



Dalton
Cardiovascular
Research Center

Committed to Collaboration in Research and Teaching

Annual Report 2000



The University of Missouri-Columbia

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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 to 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. Thirty three 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 100 manuscripts in nationally recognized journals and books and gave over 100 scientific presentations.

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.

DCRC Internal Advisory Board

Lex Akers, Ph.D., Professor and Chair of Electrical Engineering

Jack O. Burns, Ph.D., Vice Provost for Research

John D. David, Ph.D., Professor and Chair of Biological Sciences

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 and Chair of Veterinary Medicine and Surgery

Arnold L. Smith, M.D., Professor and Chair of Molecular Microbiology and Immunology

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



Richard J. Bartlett, PhD: Adjunct Associate Professor, Dalton Cardiovascular Research Center

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

William E. Dale, PhD: Research Assistant Professor and Assistant Director of Dalton Cardiovascular Research Center

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, Associate Director of Research, MU Research Reactor

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

Ramesh Khanna, MD, FACP: Professor of Medicine

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

Karl D. Nolph, MD: Curator's Emeritus Professor of Medicine

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

Margaret J. Sullivan, PhD: Research Assistant Professor of Physiology

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

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

Zbylut J. Twardowski, MD: Professor of Medicine

Xiaoqin Zou, PhD: Research Assistant Professor 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

Investigators: Booth, Bowles, Dixon, Hale, Hamilton, Hasser, Huxley, Jones, Laughlin, Price, Rubin, Terjung, Tsika

Membrane Transport

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

Muscular Dystrophy

Investigators: Bartlett, Kornegay

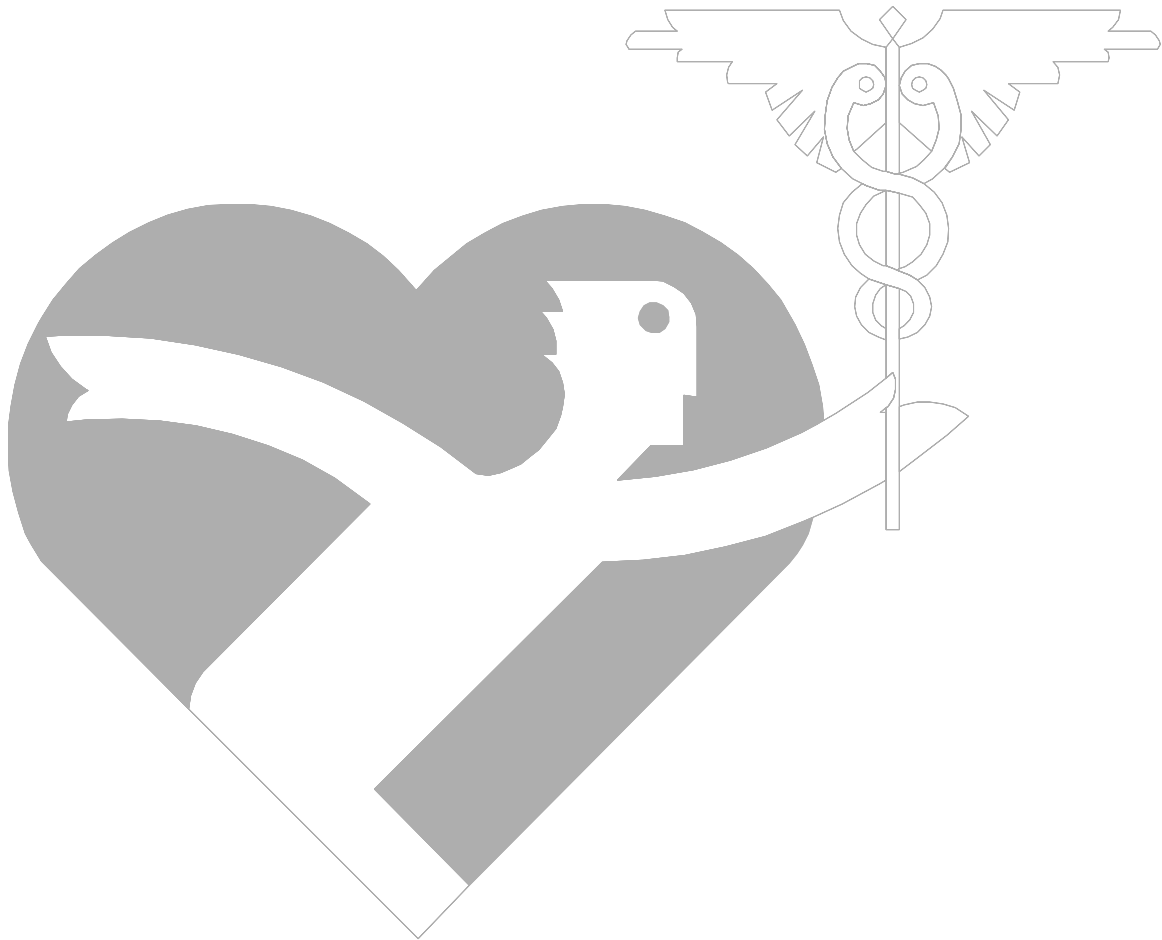
Nephrology Including Hypertension, Renal Failure, Diabetic Nephrology, and Peritoneal Dialysis

Investigators: Blaine, Dale, Khanna, Nolph, Twardowski

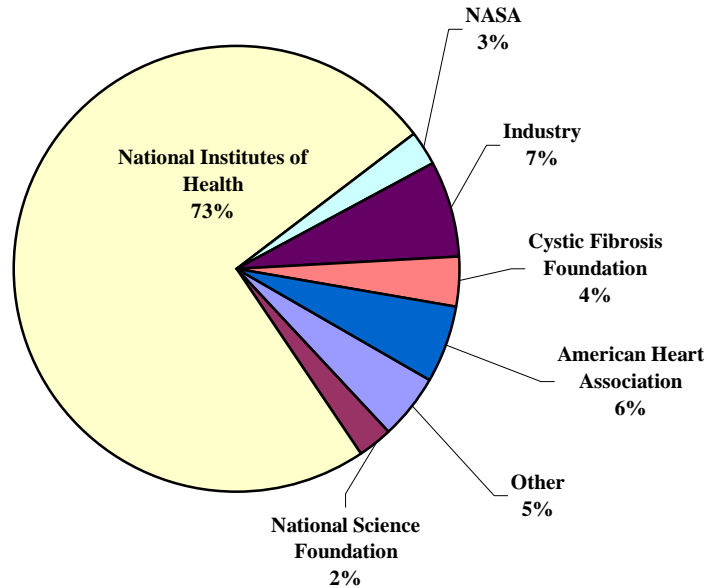
Neurohumoral Control of the Circulation Including Hypertension, Heart Failure, and Salt and Water Homeostasis

Investigators: Blaine, Cunningham, Dale, Hasser, Heesch, Hay, Price, Schadt, Sullivan

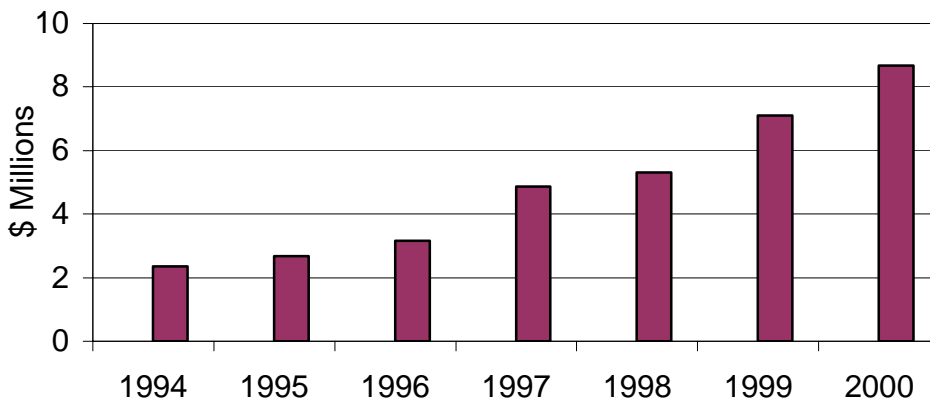
Research Funding



Sources of Funding in 2000



Dalton Investigator Grant Funding Received in 2000



Year 2000 Investigator Funding

Grant Funds – Direct Costs	\$8,666,100
Grant Funds – Indirect Costs	2,860,163
Fellowships	<u>338,700</u>
Total Funding	\$11,433,485

Grant Funds committed to Dalton Investigators as of August 2001: \$42,338,909

Dalton Principal Investigator Research Grants

(Year 2000 total costs)

American Diabetes Association

“Coronary Artery Disease and Smooth Muscle Cell Ca²⁺ Signaling in Diabetic Humans” Michael Sturek \$69,583

American Heart Association

“Calcium-Dependent Mitogenic Signaling of a P2Y Nucleotide Receptor Expressed in Dedifferentiated Vascular Smooth Muscle Cells” Michael Sturek \$16,000

“Cardiovascular Control of Vasopressin Release” Thomas Cunningham \$20,000

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

“Effects of Stress on Cardiovascular Control During Blood Loss” James Schadt \$52,200

“Gating and Blocking of CFTR Chloride Channels” Tzyh-Chang Hwang \$32,120

“Influence of Exercise and Hyperlipidemia/Hypercholesterolemia in Coronary Vascular Pro- and Anti-Oxidant Gene Expression” Harold Laughlin \$26,000

“Mutation of the Cardiac-Sodium Exchanger Regulatory Site” Calvin Hale \$38,500

“Myoplasmic Calcium Regulation is Altered in Vascular Smooth Muscle Cells Distal to Chronic Coronary Artery Occlusion” Harold Laughlin \$16,000

“Neurophysiology of Forebrain Neurons Involved in the Central Regulation of Blood Pressure” Thomas Cunningham \$38,500

“Neurotransmitter Regulation of Forebrain Projections to the Supraoptic Nucleus: Calcium Imaging in a Slice of Preparation” Margaret Sullivan \$65,000

“Role of Metabotropic Glutamate Receptors in Arterial Baroreflex” Eileen Hasser \$25,500

“Role of Ubiquitin-Proteasome Pathway in Vascular Wall Metabolism and Atherosclerosis” Joseph Dixon \$38,900

“Smooth Muscle Calcium Regulation: Cardioprotective Effects of Exercise in Diabetic Swine with Coronary Artery Disease” Michael Sturek \$18,000

“The Na, K-ATPase: Molecular Mechanisms Involved in Cardiac Glycoside Inhibition, Ion Transport and Confrontation Changes” Elmer Price \$100,000

Amgen, Inc.

“A Study Evaluating the Initiation and Titration of Fixed Doses of Novel Erythropoiesis Stimulating Protein (NESP) Therapy in Subjects with Chronic Renal Insufficiency” Ramesh Khanna \$24,990

AstraZeneca

“Candesarten Cilexetil (Candersarten) in Heart Failure Assessment of Reduction in Mortality and Morbidity (CHARM)” H.K. Reddy \$17,000

Association Francaise Contre Les Myopathies

“Expression of Human Dystrophin in Skeletal Muscle of Dystrophic Animals” Richard Bartlett \$89,2601

Baylor College of Medicine

“Role of GH/IGF-1 Axis, Loading, and Exercise on Muscle Mass” Frank Booth \$44,400

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

Bioenergy

“Post Contraction Adenine Nucleotide Recovery” Ronald Terjung \$49,193

Chiron Corporation

“Collateral Blood Flow Increases with FGF-2 in Rats with Peripheral Arterial Insufficiency: Influence of Dosing Regimens Protocol” Ronald Terjung \$59,001

Collateral Therapeutics

“Collateral Blood Flow IV” Ronald Terjung \$102,779

“Collateral Blood Flow V” Ronald Terjung \$75,881

“Collateral Blood Flow VI” Ronald Terjung \$87,017

Covance

“The Effects of Sustained-Release Moxonide on Mortality and Morbidity in Patients with Congestive Heart Failure” H.K. Reddy \$32,500

Cystic Fibrosis Foundation

“Correction of Delta F508 CFTR Processing” Lane Clarke \$60,000

“NBF1 and Restoration of Anion Secretion in F508 Cells” Lane Clarke \$64,216

“Molecular Mechanism of Action of NS004 on CFTR” Tzyh-Chang Hwang \$49,140

“Phosphate Regulation of Delta F508 CFTR” Tzyh-Chang Hwang \$68,750

“Role of Human Beta-Defensin-2 in Cystic Fibrosis Bronchitis” Arnold Smith \$91,796

MU Research Board

“Central Cardiovascular Control During Blood Loss” James Schadt \$22,500

NASA

“Signaling of Muscle Atrophy with Unloading” Frank Booth \$265,215

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

National Institutes of Health

“Angiogenic Growth Factors in Exercising Skeletal Muscle” Ronald Terjung \$30,916

“Baroreceptor Neurons - Metabotropic Receptor Modulation” Meredith Hay \$67,500

“Cardiovascular and Renal Physiology, Pharmacology and Biochemistry” Virginia Huxley
\$199,056

“Cardiovascular Control of Vasopressin Release” Thomas Cunningham \$238,208

“Cardiovascular Regulation-Hindlimb Unweighted Animals” Eileen Hasser \$231,728

“Circumventricular Organs: Gender & Hypertension” Meredith Hay \$279,865

“Cystolic Modulation of Plasma Membrane Ion Transport” Mark Milanick \$206,755

“Exercise and Coronary Adenosine Activated K Currents” Douglas Bowles \$93,520

“Exercise Training and Peripheral Arterial Insufficiency” Ronald Terjung \$300,335

“Exercise, Diabetes and Coronary Smooth Muscle Ca²⁺” Michael Sturek \$339,315

“Gating of the CFTR Cl Channel by ATP Hydrolysis” Tzyh-Chang Hwang \$102,200

“Hypertension Mechanisms and Vascular Ion Exchange” Allan Jones \$287,791

“Metabotropic Glutamate Receptors and Baroreflex Function” Eileen Hasser \$220,666

“Neural Systems of Body Fluid Homeostasis and AVP Release” Thomas Cunningham \$28,091

“Neural Systems Regulating Vasopressin Release” Thomas Cunningham \$67,500

“Ovarian Hormone Metabolites and Neural Circulatory Control” Cheryl Heesch \$159,826

“Porcine Models of Coronary Artery Disease in Diabetes” Michael Sturek \$449,978

“Regulation of Baroreceptor Afferent Transmission” Meredith Hay \$151,719

“Regulation of the Secretion of ApoB-Lipoprotein” Joseph Dixon \$196,918

“Regulatory Site Modifications of the Cardiac Na-Ca Exchanger” Calvin Hale \$51,100

“Running Induced Increase in Muscle LPL mRNA” Marc Hamilton \$200,925

“Training: Muscle Blood Flow and Capillary Dynamics” Harold Laughlin \$237,728

“Vascular Biology: Exercise Training and Coronary Disease” Harold Laughlin \$1,482,898

“Satellite Stem Cell Biology” Frank Booth \$176,314

“Invasive Noncapsulated H. Influenza” Arnold Smith \$290,000

“Molecular Aspects of Microbial Pathogenesis” Arnold Smith \$167,210

“Adenine Nucleotide Metabolism in Skeletal Muscle” Ronald Terjung \$315,101

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

“Exercise Hypertrophy and Control of Myosin Induction” Richard Tsika \$195,200

“Exercise-Induced Growth of Skeletal Muscle” Frank Booth \$204,450

“Role of Angiotensin II in Skeletal Muscle Hypertrophy” Frank Booth \$37,516

“CFTR and Alimentary Epithelial Acid/Base Transport” Lane Clarke \$140,731

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

“Molecular Pathophysiology of Cystic Fibrosis” Tzyh-Chang Hwang \$204,965

“Cellular Free Radical Toxicity Mechanisms” Olen Brown \$227,669

“Ca Sensing for Exocytosis” Kevin Gillis \$237,550

“The Role of Estrogen in the Male Reproductive Tract” Lane Clarke \$53,089

National Science Foundation

“Cellular Electrophysiology on a Chip” Kevin Gillis \$273,879

Muscular Dystrophy Association

“Investigative Therapeutics in a Canine Model of Duchenne Muscular Dystrophy” Joe Kornegay
\$82,000

Pharmacia, Inc.

“Cox-2 Gene Transfer” Michael Sturek \$50,000

“Material Evaluation Agreement: Cox 2 Inhibitors in Anti-Atherogenic Therapy” Michael Sturek
\$58,400

Proctor & Gamble

“VEGF-Mediated Collateral Blood Flow” Ronald Terjung \$85,720

Scios, Inc.

“A Multicenter, Randomized, Double-Blind, Placebo-Controlled Study of the Effects of Natreacor (Nesiritide) Compared with Nitroglycerin Therapy for Symptomatic Decompensated CHF-704.339” H.K. Reddy \$52,911

“Treatment of Peripheral Arterial Disease with VEGF121” Ronald Terjung \$80,665

SmithKline Beecham

“A Multicenter, Randomized, Double-Blind, Placebo-Controlled Study to Determine the Effect of Carvedilol on Mortality and Morbidity in Patients with Severe Chronic Heart Failure” H. K. Reddy
\$12,562

Whitaker Foundation

“Computerized Characterization of Left Ventricle Shape and Dynamics “ Chang Wen Chen
\$21,179

“Techniques for Membrane Capacitance Measurements in the Presence of Non-Linear Conductances” Kevin Gillis \$79,502

Fellowships

American Heart Association

“Estrogen Modulation of Angiotensin II and Vasopressin-Mediated Effects on Area Postrema Neuronal Activity” Jayabala Pamidimukkala (Meredith Hay, sponsor) \$26,000

“Interaction of AngII and L-Glu on Area Postrema Voltage-Gated and Calcium Activated Potassium Channel” Zhicheng Li (Meredith Hay, sponsor) \$28,000

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

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

“The Role of Phosphorylation/Dephosphorylation in Trafficking of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR)” Zhen Zhou (Tzyh-Chang Hwang, sponsor) \$26,000

American Physiological Society

“Regulation of Lipoprotein Lipase mRNA by the 3' Untranslated Region” Grady Campbell (Frank Booth, sponsor) \$35,500

Cystic Fibrosis Foundation

“Ion Transport Deregulation in the Murine CF Intestine, Study of Sodium Chloride Absorption” Xavier Stien (Lane Clarke, sponsor) \$33,500

“A Novel Model and System for Studying CFTR Processing” Stacie Raymond (Elmer Price, sponsor) \$43,200

National Institutes of Health

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

United Negro College Fund

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

Total Fellowship Funding Received: \$338,700

Educational Opportunities



The Dalton Cardiovascular Research Center offers an excellent training program for graduate and undergraduate students, postdoctoral fellows, and other professionals. Students have the opportunity to attend research seminars, interact with internationally recognized scientists, and to take part in research supervised by Dalton investigators.

Thirty-one postdoctoral fellows, 17 graduate students, and six undergraduate students were supervised by Dalton Investigators in the year 2000.

Postdoctoral Fellows

Student	Advisor
Lionel Bey Veterinary Biomedical Sciences	Dr. Marc Hamilton
Silvia Bompadre Physiology	Dr. Tzyh-Hwang Hwang
Julie Bossuyt Veterinary Biomedical Sciences	Dr. Calvin Hale
Peng Chen Electrical Engineering	Dr. Kevin Gillis
Martin Childers Veterinary Biomedical Sciences	Dr. Joe Kornegay
Arvinder Dhalla Veterinary Biomedical Sciences	Dr. Leona Rubin
Zhiqiang Fan Veterinary Biomedical Sciences	Dr. Frank Booth
Charles Foley Veterinary Biomedical Sciences	Dr. Cheryl Heesch
Scott Gordon Veterinary Biomedical Sciences	Dr. Frank Booth
Regina Grindstaff Physiology	Dr. Thomas Cunningham
Naveed Haq Nephrology	Dr. Ramesh Khanna
Christine Heaps Veterinary Biomedical Sciences	Dr. Douglas Bowles
Natalia Karasseva Veterinary Biomedical Sciences	Dr. Richard Tsika
Lyudmila Kvochina Veterinary Biomedical Sciences	Dr. Leona Rubin
Han Li Physiology	Dr. Ronald Terjung
Zeyi Li Physiology	Dr. Ronald Terjung

Mingxiang Liao Veterinary Biomedical Sciences	Dr. Richard Tsika
Pam Lloyd Physiology	Dr. Ronald Terjung
Patrick Mueller Veterinary Biomedical Sciences	Dr. Eileen Hasser
Carol Okamura Veterinary Biomedical Sciences	Dr. Joe Kornegay
Allan Powe Physiology	Dr. Tzyh-Chang Hwang
Barry Prior Physiology	Dr. Ronald Terjung
Stacie Raymond Dalton Cardiovascular Research Center	Dr. Elmer Price
Jie Ren Physiology	Dr. Ronald Terjung
Xavier Stien Dalton Cardiovascular Research Center	Dr. Lane Clarke
Dharmesh Vyas Veterinary Biomedical Sciences	Dr. Frank Booth Dr. Ronald Terjung
Christopher Woodman Veterinary Biomedical Sciences	Dr. Elmer Price
Elzbieta Wysocka Physiology	Dr. Joseph Dixon
Bao Jian Xue Dalton Cardiovascular Research Center	Dr. Meredith Hay
Yan Yang Physiology	Dr. Leona Rubin
Y. Yu Electrical Engineering	Dr. Chang Wen Chen
Zhen Zhou Physiology	Dr. Tzyh-Chang Hwang

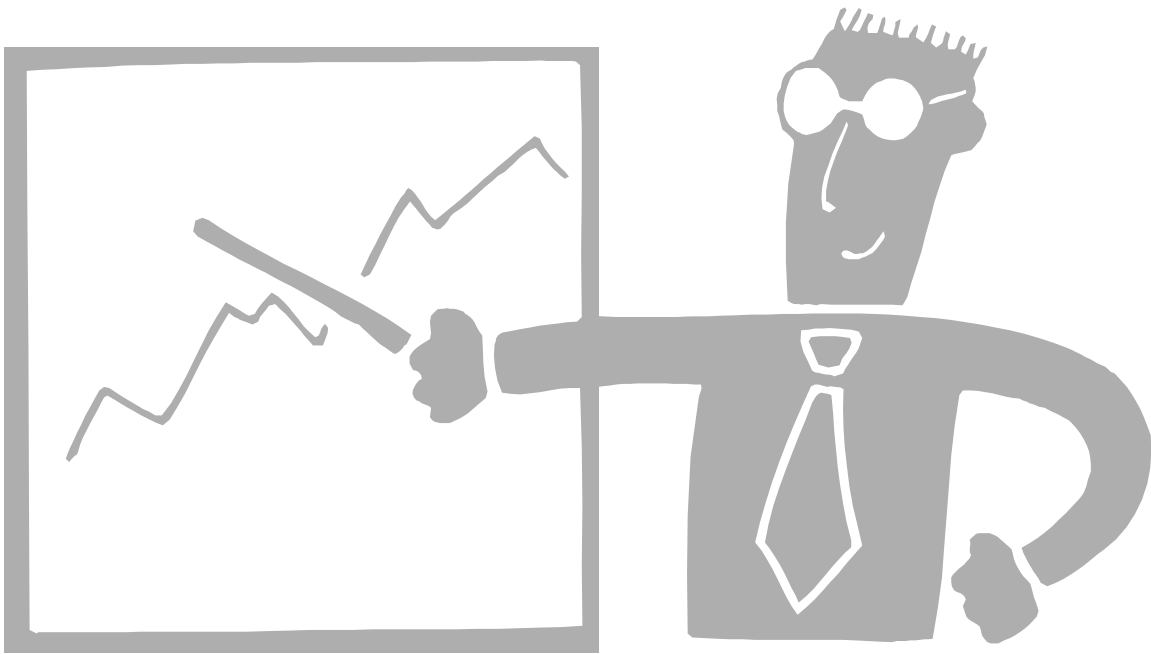
Graduate Students

Student	Advisor
Aaron Aaker Veterinary Biomedical Sciences	Dr. Harold Laughlin
Kirk Abraham Physiology	Dr. Ronald Terjung
Jeffrey Brault Physiology	Dr. Ronald Terjung
Jianfei Cai Electrical Engineering	Dr. Chang Wen Chen
Lei Cao Electrical Engineering	Dr. Chang Wen Chen
James Dunning Electrical Engineering	Dr. Kevin Gillis
Li Fan Electrical Engineering	Dr. Chang Wen Chen
Lara Gawenis Veterinary Biomedical Sciences	Dr. Lane Clarke
Chad Hancock Physiology/Veterinary Biomedical Sciences	Dr. Ronald Terjung
Caroline Hoang Veterinary Biomedical Sciences	Dr. Meredith Hay
Sonia Houston Physiology	Dr. Virginia Huxley
Catherine Regni Biochemistry	Dr. Xiaoqin Zou
William Schrage Physiology	Dr. Harold Laughlin
Sangeetha Udayasankar Electrical Engineering	Dr. Kevin Gillis
Jian Wang Electrical Engineering	Dr. Chang Wen Chen
Jianjie Wang Physiology	Dr. Virginia Huxley
Patricia Williamson Biochemistry	Dr. Margaret Sullivan

Undergraduates

Student	Advisor
Monica Bell Arts & Sciences/Anthropology	Dr. Cheryl Heesch
Hope Gole Agriculture	Dr. Meredith Hay
Saumil Karavadia Biochemistry	Dr. Edward Blaine
Susan Marren Arts & Sciences	Dr. Cheryl Heesch
Tina Parks Animal Sciences	Dr. Lane Clarke
Bonnie Taylor Biological Sciences	Dr. Calvin Hale
Tara Wiggins Biological Sciences	Dr. Lane Clarke

Seminar Series



“IGF-I Rescues Old Skeletal Muscle Failing to Regrow from Disuse Atrophy”

Frank Booth
University of Missouri-Columbia
Columbia, Missouri

***“Intracellular and Extracellular pH Microdomains in Colonic Epithelium:
Unusual Mechanisms for Regulation of Sodium Absorption”***

Marshall H. Montrose
Indiana University
Indianapolis, Indiana

“Role of the Glycocalyx in Endothelial Cell Ligand Receptor Interaction”

Paul van Haaren
University of Amsterdam
Amsterdam, The Netherlands

“Progression of Renal Disease”

Saulo Klahr
Washington University School of Medicine
and Barnes Jewish Hospital
St. Louis, Missouri

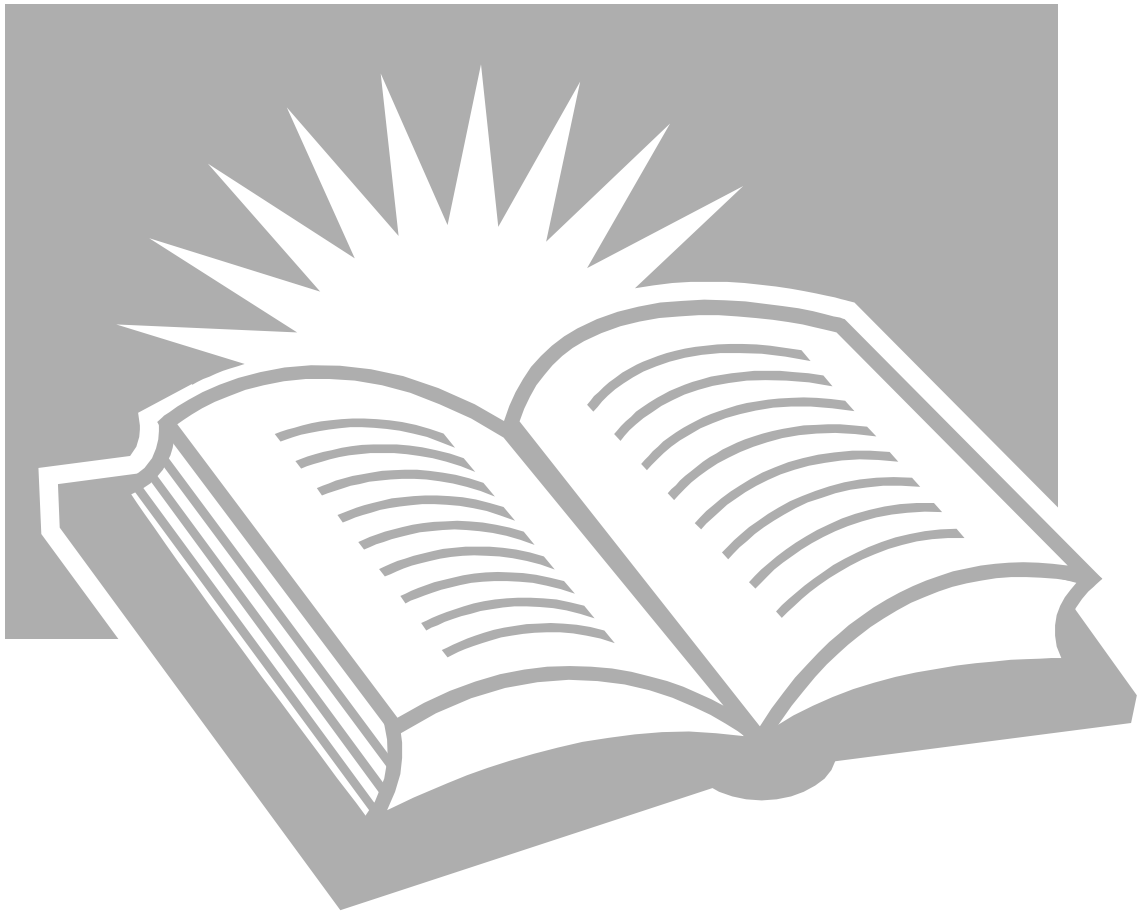
***“Do Sympathetic-Angiotensin Interactions Contribute to Long-Term Control of
Arterial Pressure?”***

John W. Osborne
University of Minnesota
St. Paul, Minnesota

***“Inferring roles of SNARE proteins in exocytosis from fast kinetic
measurements on adrenal chromaffin cells”***

Erwin Neher
Max-Planck-Institute for
Biophysical Chemistry,
Göttingen, Germany

Publications



Abstracts

Booth

- Britt, A.A., S.E. Gordon, F.W. Booth, and M.R. Deschenes. Recovery of neuromuscular junction morphology following 17 days of spaceflight. Southeast Regional Chapter, American College of Sports Medicine, Charlotte, NC. January, 2000.
- Allen, M.R., S.E. Gordon, B. Davis, M. Fiorotto, R. Schwartz, F.W. Booth, and S.A. Bloomfield. Skeletal muscle IGF-I overexpression increases bone density but not mechanical strength and prevents hindlimb unloading bone loss in mature mouse tibia. Texas Regional Chapter, American College of Sports Medicine, College Station, TX. February, 2000.
- Gordon, S.E., B.S. Davis, C.J. Carlson, and F.W. Booth. Angiotensin II (AII) is required for optimal overloading-induced skeletal muscle hypertrophy. Keystone Symposium 2000: "Joint Regulation of Signaling Pathways by Integrins and Growth Factors", Breckenridge, CO. March, 2000.
- Allen, M.R., S.E. Gordon, B. Davis, M.L. Fiorotto, R.J. Schwartz, F.W. Booth, and S.A. Bloomfield. Skeletal muscle IGF-I overexpression alters bone development and prevents short-term hindlimb unloading bone loss in adult mouse tibia. American Society for Bone and Mineral Research, Toronto, Canada. September, 2000.
- Gordon, S.E., B.S. Davis, C.J. Carlson, and F.W. Booth. Angiotensin II is required for optimal overload-induced skeletal muscle hypertrophy. American Physiological Society, Portland, ME. September, 2000.

Bowles

- D.K. Bowles. Gender differences in coronary Ca²⁺ current density are species dependent. FASEB J. 2000.
- D.H. Korzick, C. Galle and D.K. Bowles. Altered Ca²⁺ channel characteristics and PKC interactions in aged rat coronaries. FASEB J. 2000.
- C.L. Heaps, D.K. Bowles, M. Sturek, M.H. Laughlin and J.L. Parker. Increased voltage-gated Ca²⁺ current (VGCC) density in coronary smooth muscle of exercise trained pigs is compensated to limit net Ca²⁺ accumulation. FASEB J. 2000.
- D.K. Bowles. High intensity exercise training increases coronary Ca²⁺ current density in the rat. Physiologist, 43 (4): 350, 2000.
- D.K. Bowles. Coronary adaptation to exercise: Cellular aspects. Physiologist, 43 (4): 317, 2000.
- B. Wamhoff, D.K. Bowles, N.J. Dietz, Q. Hu and M. Sturek. Exercise training attenuates endothelin induced proliferation and nuclear calcium signaling in coronary smooth muscle. Physiologist, 43 (4): 350, 2000.
- M.H. Laughlin, V.K. Ganjam, and D.K. Bowles. Gender-dependent effects of exercise training on endothelium and vascular smooth muscle. Physiologist, 43 (4): 337, 2000.
- Heaps, C.L. and D.K. Bowles. K⁺ channel contribution to adenosine-induced vasodilation is gender specific. FASEB J. In press.

Clarke

- Huang, F, Clarke, LL, Erwin, C, and Warner, B. Chemotherapy-Induced Intestinal Injury Is Associated With Increased Paracellular Permeability. American Association for Cancer Research, San Francisco, CA. April 4, 2000.

- Gawenis, LR, Schultheis, P, Shull, G, and Clarke, LL. Contribution of NHE2 and NHE3 to Na Absorption in the Murine Jejunum. American Gastroenterological Association, Digestive Disease Week, San Diego, CA. May 21 - 25, 2000.
- Walker, NM, Flagella, M., Gawenis, LR Shull G, and Clarke LL. cAMP Stimulated Anion Secretion Across NKCC1 Knockout Intestine. *Gastroenterology* 114: A552. 101st Annual Meeting of the American Gastroenterological Association, Digestive Disease Week, San Diego, CA. May 21 - 25, 2000. Poster of Distinction.
- Zhou, Q, Bunick, D, Clarke, LL, Lien, H, Lee, K.-H., Nie, R, Carnes, K, Bunick, C, Lubahn, D, and Hess, RA. Carbonic anhydrase II (CAII) and sodium/hydrogen exchanger (NHE3) in efferent ductules of the male estrogen receptor knockout (ERKO) mouse and comparison to CAII and NHE3 deficient mice. Society for the Study of Reproduction, Madison, WI. July 15-18, 2000.
- Stien, X, Walker, NM, Gawenis, LR and Clarke, LL. Expression of Ion Transporters in Small Intestinal Epithelium From Cystic Fibrosis (CF) and Wild-type (WT) Mice. *Gastroenterologie S3: 16. Intestinal Transport and Barrier Functions, Internationales Symposium of the German Gastroenterology Association, Tübingen, Germany.* September 9-12, 2000.
- Walker, N, Flagella, M, Stien, X, Gawenis, L, Shull, G and Clarke, LL. An Alternate Pathway for cAMP Stimulated Chloride Secretion Across NKCC1-Null Intestine. *Gastroenterologie S3: 7. Intestinal Transport and Barrier Functions, Internationales Symposium of the German Gastroenterology Association, Tübingen, Germany.* September 9-12, 2000.
- Walker, NM, Flagella, M, Stien, X, Gawenis, LR, Shull, G and Clarke, LL. Alternate Pathways of cAMP-Stimulated Chloride and Bicarbonate Secretion Across the NKCC1-Null Intestine. *Pediatr. Pulmonol. Suppl. 20: 195. 14th Annual North American Cystic Fibrosis Conference, Baltimore, MD. November 9 - 12, 2000.*

Cunningham

- Cunningham JT, Bruno SB, Higgs KAN, Sullivan MJ. (2000) Intrapericardial procaine effects volume expansion-induced Fos expression in conscious rats. *FASEB J.*, 14.
- Grindstaff RR, Grindstaff RJ, Cunningham JT. (2000) Activation of cardiac receptors alters the activity of supraoptic vasopressin but not oxytocin neurons in the rat. *FASEB J.*, 14.
- Mazzella D, Cunningham JT, Sullivan MJ. (2000) The effects of diagonal band (DBB) on vasopressin release. *FASEB J.*, 14.
- Stanton JJ, Foley CM, Cunningham JT, Price EM, Hasser EM, Heesch CM. (2000) Alterations in GABA_A receptor α 1 and α 2 subunit expression in the supraoptic and paraventricular nuclei of pregnant rats. *FASEB J.*, 14.
- Foley CM, Stanton JJ, Hasser EM, Cunningham JT, Price EM, Heesch CM. (2000). GABA_A receptor α 1, α 2, and α 3 subunit expression in discrete cardiovascular related brainstem regions in nonpregnant and pregnant rats. *FASEB J.*, 14.
- Hasser, EM, Sullivan MJ, Cunningham JT. (2000) Reflex control of vasopressin release following hindlimb unloading Society for Neurosciences, 26, 1948.
- Grindstaff, RR, Cunningham JT. (2000) Sensitivity of vasopressin SON neurons of PNZ lesioned rats to caval-atrial stretch. *Soc. For Neurosciences*, 26, 130.

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Books and Book Chapters

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Huxley

Huxley, V.H. and R.E. Rumbaut, 2000. "Microvascular Permeability in Inflammation" In: Physiology of Inflammation, K. Ley, ed. Ch. 4, Oxford:NY, pp. 65- 79.

Khanna

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Terjung

Terjung, R.L., R. Zarzeczny, and H.T. Yang. Muscle blood flow and mitochondrial function: Influence of Aging. In: Biochemistry of Exercise XI. W. Evans (Ed.), Human Kinetics Pub., Champaign, Il, In Press.

Twardowski

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Awards, Honors and Offices



Awards, Honors, and Offices

Blaine

Excellence in Medical Education Award
Editorial Board, American Journal of Physiology
President, Boone County Board of the American Heart Association

Booth

Associate Editor, Journal of Applied Physiology,
Editorial Board, American Journal of Physiology: Cell Physiology
Editorial Advisor to Biochemical Journal
Ad hoc, Respiratory and Applied Physiology Study Section, October 2000
Ad hoc, NIH Special Emphasis Study Section, November 2000
NIH reverse site visit for program project grant, November 2000

Bowles

Fellow, American College of Sports Medicine

Brown

Editorial Board, Biomedical Letters, The Faculty Press, Cambridge, England

Chen

Editorial Board, Journal of Computerized Medical Imaging and Graphics
Editorial Board, Journal of Visual Communications and Image Representation
Associate Editor, IEEE Trans. Circuits and Systems for Video Technology
Guest Editor, IEEE Journals on Selected Areas in Communications

Clarke

Editorial Board, American Journal of Physiology: Gastrointestinal and Liver Physiology

Cunningham

Dorsett L. Spurgeon, MD, Distinguished Medical Research Award. University of Missouri-Columbia School of Medicine, Fall 2000.
Editorial Board, American Journal of Physiology: Heart and Circulatory Physiology
Editorial Board, American Journal of Physiology: Regulatory, Integrative and Comparative Physiology

Hamilton

Editorial Board: Journal of Applied Physiology

Hasser

Associate Editor, American Journal of Physiology, Heart Circ. Physiol.

Heesch

Editorial Board American Journal of Physiology: Heart and Circulatory Physiology

Huxley

Associate Editor, Microcirculation, Editorial board of Journal of Vascular Research
Chair, USNAS commission to IUPS
National Organizing Committee for IUPS 2005
Delegate, International Union of Physiological Sciences (IUPS), US delegation IUPS Congress,
Christ Church, NZ 2001
Microcirculatory Society, Long Range Planning Committee
Associate Editor, Microcirculation
Editorial Board, American Journal of Physiology: Heart and Circulatory Physiology
Editorial Board, Microvascular Research
Editorial Board, Microcirculation
Editorial Board, Journal of Vascular Research
NIH DDK Program Project Site Visit, University of Louisiana-Shreveport

Hwang

Paul Cranfield Award, Society of General Physiologists
Excellence in Medical Student Education, MU Medical School

Heesch

Education Committee, American Physiological Society
Symposium Speaker—International Soc. Autonomic Neurosci. Satellite 2000
“New Perspectives on Central Nervous Control of Cardiovascular Regulation”
Symposium Speaker—Amer. Physiol. Soc. Conference “Baroreceptor and Cardiopulmonary
Receptor Reflexes

Jones

Hugh Stephenson Award for Research, American Heart Association Missouri Affiliate

Khanna

Dr. K. S. Chugh, Founders Oration 2002 Award. By the Indian Society of Nephrology
Academic Affairs Committee, American Association of Physicians of Indian Origin
Continuing Medical Education Committee, American Association of Physicians of Indian Origin
Editor, Advances in Peritoneal Dialysis
Editor, Peritoneal Dialysis Today (Highlights of the Annual Conference on Peritoneal Dialysis)
Editor, PD News (Newsletter of the International Society for Peritoneal Dialysis)
Deputy Editor, Peritoneal Dialysis International
Associate Editor, Home Hemodialysis International
Editorial Board, International Journal of Artificial Organs
Editorial Board, Transactions of the American Society for Artificial Internal Organs
Editorial Board, Kidney: A Current Survey of World Literature
Editorial Board, Indian Journal of Peritoneal Dialysis
Editorial Board, American Journal of Kidney Disease

Laughlin

Associate Editor, Medicine and Science In Sport and Exercise
Editorial Board, Journal of Applied Physiology

Milanick

Editorial Board, Journal of Membrane Biology

Nolph

Pioneer Continuous Ambulatory Peritoneal Dialysis Award. San Francisco, California.

Editorial Board, Nephron

Editorial Board, Kidney International

Editorial Board, Journal of Dialysis

Editorial Board, Peritoneal Dialysis International (formerly Peritoneal Dialysis Bulletin)

Editorial Board, Contemporary Dialysis

Editorial Board, American Journal of Nephrology

Editorial Board, Dialysis & Transplantation

Editorial Board, Nephrology News & Issues

Editorial Board, Seminars in Dialysis

Editorial Board, Kidney: A Current Survey of World Literature

Editorial Board, Advances in Renal Replacement Therapy (ARRT)

Editorial Board, Journal of the American Society of Nephrology

Editorial Board, Peritoneal Dialysis Today

Editorial Board, Hong Kong Journal of Nephrology (Honorary International Advisor)

Editorial Board, Indian Journal of Peritoneal Dialysis

Editor-in-Chief, Peritoneal Dialysis Today

Associate Editor, Peritoneal Dialysis Bulletin (Peritoneal Dialysis International)

Associate Editor, Nephrology Section Editor - Transactions of the American Society for Artificial Internal Organs

Associate Editor, Advances in Peritoneal Dialysis

Associate Editor, Home Hemodialysis International (Hemodialysis International)

Schadt

Golden Aesculapius Teaching Award, University of Missouri College of Veterinary Medicine

Editorial Boards, American Journal of Physiology: Heart and Circulatory Physiology

Editorial Board, Journal of Applied Physiology

Smith

Service Award for Excellent in Teaching, University of Missouri-Columbia, 2000

Editorial Board, Journal of Infectious Disease

Terjung

Pfizer Award for Research Excellence, June 2000

Gold Chalk Award, MU Graduate Professional Council, April 2000

Member, IUPS Commission on Work and Exercise Physiology. March 1999 to present

American Physiological Society

Elected Program Chair, Environmental & Exercise Section Steering Committee, 1996-00.

Elected Section Representative, APS Program Committee, 1996-2000.

American College of Sports Medicine,

Chair, Research Advisory Committee, 2000-Present

Member, Advisory Committee, August Krogh Institute, University of Copenhagen, Denmark.
1993-Present

Member, IUPS Commission on Work and Exercise Physiology. March 1999 to present

Tsika

Editorial Board, Journal of Applied Physiology

Twardowski

International Society for Hemodialysis, Member Founder, 2000

International Society for Hemodialysis, Interim Secretary, 2000

Member of the Honor Committee of the First International Congress of Nephrology via Internet,
January 2000

Member of the Program and Scientific Committees of the 20th National Conference on
Peritoneal Dialysis, Chairman of the 6th International Symposium on Home
Hemodialysis, San Francisco, California, February 27 - 29, 2000

Editorial Board, The Journal of Vascular Access, Milano, Italy, 2000

Editorial Board, Hemodialysis Today, 2000

Patents



Patents

Chen

A Novel Scheme for Transmitting Standard Compressed Visual Information over Error-prone Environment by J. Cai and C.W. Chen. UM Disclosure No. 01UMC033

A Novel Product Coding and Recurrent Alternative Decoding Scheme by L. Cao and C. W. Chen. UM Disclosure No. 01UMC028

Hale

Large Scale Expression and Purification of Recombinant Proteins, U.S. Provisional Application Serial No. 60/218,125 filed July 13, 2000.

Twardowski

Twardowski ZJ, Nichols WK, Van Stone JC: Clot resistant multiple lumen catheter and method. Disclosed to the Office of Research and Patent Development as "Multiple lumen catheters for hemodialysis (New tip design of intravenous catheter for hemodialysis) ", and assigned number 94-UMC-036. Submitted through the offices of GERSTMAN & ELLIS, LTD., Case No. 632 P 021, Two N. LaSalle Street, Suite 2010, Chicago, Illinois 60602, Garrettson Ellis, Esq. Assignee: Curators of the University of Missouri, Columbia, MO. Application No. 386,473, February 9, 1995. Continuation-in-part of Ser. No. 45, 016, April 8, 1993, Patent No. 5,405,320 which is a continuation-in-part of Ser. No. 772,613, October 8, 1991, U.S.A. patent number: 5,209,723 which is a continuation of Ser. No. 461,684, January 8, 1990, abandoned. **U.S.A. patent number 5,569,182, granted on October 29, 1996.** Expiration October 29, 2013.

- a) PCT (Patent Cooperation Treaty), application No. PCT/US96/01318. Decided to nationalize June 25, 1997
- b) Australian patent 706109. Applicants: The Curators of the University of Missouri. Application number 199649113 filed January 31, 1996. Patent granted on September 23, 1999. Expiration January 31, 2016.
- c) Australian patent No.: 723137 (Divisional of 49113/96), Application 22565/99, filed March 31, 1999, Date of Sealing: November 30, 2000. Name of Patentee: The Curators of the University of Missouri. Title of Invention: Clot Resistant Multiple Lumen Catheter. Lodgment date: 31 March 1999. Expiry Date: 31 January 2016 (20 years)

Twardowski ZJ, Kenley RS: Method for flushing and filling of an extracorporeal blood circulation system of a dialysis machine. Submitted through the offices of GERSTMAN & ELLIS, LTD., Case No. 632 P 003, Two N. LaSalle Street, Suite 2010, Chicago, Illinois 60602, Garrettson Ellis, Esq. Application No. 08/335,102, November 7, 1994. Division of Application No. 08/155,993, November 22, 1993. Patent No. 5,484,397, which is a division of Application No. 07/748,036, August 21, 1991, Patent No. 5,336,165. **U.S.A. patent number 6,132,616, granted on October 17, 2000.** Expiration October 17, 2017.

Twardowski ZJ: Method of preparing a batch of dialysis solution. Submitted through offices of McDonnell Boehnen Hulbert & Berghoff, Kala Point Professional Building, Suite 204, 260 Kala Point Drive, Port Townsend, WA 98368, Thomas A Fairchild, Esq. Case No. 96,405-B. Application No. 09/290,151, April 12, 1999. Division of Application No. 08/829,537, March 28, 1997. Patent No. 5,902,476, which is a division of Application No. 08/335,102, November 7, 1994, which is a division of Application No. 08/155,993, November 22, 1993. U.S.A. patent number 5,484,397, which is a division of Application No. 07/748,036, August 21, 1991, patent number 5,336,165. **U.S.A. patent 6,146,536 granted on November 14, 2000.** Expiration April 12, 2019.

Pending: Twardowski ZJ: Method and apparatus for locking of central-vein catheters. Seyfarth & Shaw, Attorneys, Matter No. 40900. Submitted to the United States Department of Commerce, Patent and Trademark Office on June 16, 2000, Serial No. 09/595,611.

Peer Review



Blaine

Reviewer, Hypertension
Reviewer, American Journal of Physiology
Reviewer, Cardiovascular Pharmacology
Reviewer, Canad. J. Physiol Pharm.
Ad Hoc Grant Review, Wellcome Trust
Ad Hoc Grant Review, MU Research Board

Booth

Ad hoc panel to evaluate NASA Life Sciences Competitive Peer Review Process
Member International Union of Physiological Sciences commission on Work and Exercise
Physiology
Chair, Muscle Biology Peer Review Panel, NASA

Brown

Peer Review of ATSDR's Draft Medical Management Guideline on Ammonia
Reviewer, Proceedings of the National Academy of Science
Reviewer, Environmental Health Perspectives
Reviewer, American Journal of Physiology
Reviewer, Heart and Circulatory Physiology
Reviewer, Archives of Biochemistry and Biophysics
Reviewer, Chemical Research in Toxicology
Reviewer, Free Radical Biology and Medicine
Reviewer, Biomedical Letters

Bowles

Reviewer, Journal of Experimental Biology
Reviewer, Research Board Grants, University of Missouri System 1995-00
Reviewer, Journal of Applied Physiology
Reviewer, American Journal of Physiology: Heart and Circ. Physiology
Reviewer, Medicine & Science in Sports & Exercise

Chen

NSF Biomedical Engineering Program Review Panel
NSF ITR Program Wireless Communications Review Panel

Clarke

Reviewer, American Journal of Physiology: Gastrointestinal and Liver Physiology
Reviewer, American Journal of Physiology: Cell Physiology
Reviewer, Gastroenterology
Grant Review, Missouri Research Board
Grant Review, Cystic Fibrosis Foundation
Grant Review, National Institutes of Health Ad Hoc Medical Biochemistry Study Section

Cunningham

Reviewer, Hypertension
Reviewer, Brain Research
Reviewer, Brain Research Bulletin
Reviewer, Circulation Research

Dale

Reviewer, Cardiovascular Research

Dixon

Editorial Comments: Lipid metabolism. Cur. Opin. Lipidology. 5:U143-U144, 1994.
Editorial Comments: Lipid Metabolism and Nutrition. Cur. Opin. Lipidology. 8: U81-U83,
1997.
Reviewer, Journal of Lipid Research
Reviewer, Journal of Biological Chemistry
Reviewer, Biochimica et Biophysica Acta
Reviewer, Atherosclerosis
Study Section, NIH Study Section Emphasis Panel, Protease Inhibitor Related Atherosclerosis in
HIV Infection

Gillis

Reviewer, Nature
Reviewer, Science
Reviewer, Neuron
Reviewer, EMBO Journal
Reviewer, Biophysical Journal
Reviewer, Journal of Theoretical Biology
Ad Hoc Reviewer, NIH
Ad Hoc Reviewer, MU Research Board

Hamilton

Ad hoc referee for Journal of Molecular and Cellular Cardiology, American Journal of
Physiology-Cell, European Journal of Lipid Science and Technology.

Hale

Reviewer, American Journal of Physiology
Reviewer, American Heart Association – Great American Consortium
Reviewer, Biochimica et Biophysica Acta (Amsterdam, The Netherlands)

Hasser

Grant Review, American Heart Association, Heartland Section
Reviewer, American Journal of Physiology
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

Hay

Reviewer, American Journal of Physiology, Heart and Circulation
Reviewer, American Journal of Physiology, Regulatory, Integrative
Reviewer, Hypertension
Reviewer, Journal of Neurophysiology
Reviewer, Journal of Physiology, London
Reviewer, Brain Research
Reviewer, Journal of Autonomic Nervous System
Reviewer, Journal of Applied Physiology
Grant Review: NIH Study Section ECS, American Heart Association National

Heesch

Guest Review, Journal of Applied Physiology
Guest Review, Hypertension
Reviewer, Regulatory, Integrative, and Comparative
Reviewer, Journal of Physiology (London)
Grant Review, NIH, Cardiovascular and Renal Study Section (CVB)

Huxley

Guest Review, American Journal of Physiology (Heart & Circulation; Cell; Regulatory, Integrative & Comparative; Endocrine & Metabolism)
Guest Review, Circulation Research
Guest Review, Biorheology
Guest Review, Biophys. Biochem. Acta
Guest Review, Journal of Applied Physiology
Guest Review, Journal of Physiology (London)
Guest Review, Annals of Biomedical Engineering
Guest Review, Hypertension

Hwang

Reviewer, Journal of General Physiology
Reviewer, Journal of Biological Chemistry
Reviewer, Biophysical Journal
Reviewer, Journal of Physiology
Grant Review, NIH (GMB, ad hoc member)

Khanna

The 2000 ASN Abstract Review Team
International Society for Peritoneal Dialysis Abstract Review Committee

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, American Journal of Physiology
Reviewer, Aviation, Space, and Environmental Medicine
Reviewer, Blood Vessels; Circulation
Reviewer, Circulation Research
Reviewer, Hypertension
Reviewer, Microvascular Research
Reviewer, Microcirculation
Grant Reviewer, Office of Naval Research
American Physiological Society Committee on Committees

Milanick

Grant Review, Israeli Science Foundation
Grant Review, American Heart Association Heartland Affiliate Study Section
Grant Review, NIH General Medicine Study Section
Reviewer, American Journal of Physiology
Reviewer, Cell Physiology
Reviewer, Biochimica Biophysica Acta
Reviewer, 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

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

Rovetto

Grant Reviewer for the Italian Ministry for University and Research
Editorial Board, Circulation Research

Schadt

Grant Review

American Heart Association, National (Cardiovascular Regulation II Study Group)

American Osteopathic Association

U.S. Army (Coordinated through AIBS)

Smith

Ad hoc reviewer Medical Research Council of Canada

Ad hoc reviewer National Sciences Foundation

Ad hoc reviewer for Cystic Fibrosis Foundation of Canada

Ad hoc reviewer Thrasher Foundation

NIH Peer Review Oversight Group (PROG)

Terjung

Academic Promotion and Appointments Committee, Biomedical Sciences

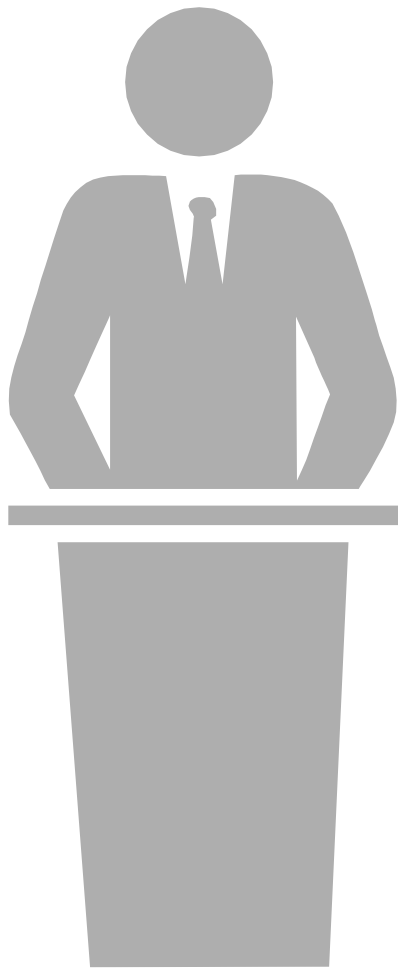
Research Advisory Committee, Biomedical Sciences

Tsika

Reviewer, Journal of Biological Chemistry

Reviewer, Molecular Cardiology

Presentations and Lectures



Presentations and Lectures

Bowles

Wamhoff, B.R., D.K. Bowles, N.J. Dietz, Q. Hu and M. Sturek. Nuclear Ca²⁺ buffering in smooth muscle: Ultrastructure, SERCA, Exercise. Presented at the 2000 FASEB Smooth Muscle Conference, Snowmass, CO

University of Missouri, Dept. of Biomedical Sciences; October, 2000.

APS Integrative Biology of Exercise Meeting, Portland, Maine; September, 2000.

Kansas State University, Dept. of Anatomy and Physiology, College of Vet. Medicine, March, 2000.

Chen

L. Cao and C. W. Chen, "Scene adaptive multiple coding scheme for robust image transmission," Proc. IEEE Wireless Communications and Networking Conference, September 2000, Chicago, IL.

J. Cai, Q. Zhang, W. Zhu and C.W. Chen, "A FEC-based error control scheme for wireless MPEG-4 video transmission," Proc IEEE Wireless Communications and Networking Conference, September 2000, Chicago, IL.

Y. Yu and C.W. Chen, "SNR scalable transcoding for video over wireless channels," Proc. IEEE Wireless Communications and Networking Conference, September 2000, Chicago, IL.

L. Cao and C.W. Chen, "A novel product coding and decoding scheme for wireless image transmission," Proc. IEEE International Conf. on Image Processing 2000, September 2000, Vancouver, Canada.

Y. Yu, J. Zhou and C.W. Chen, "A high performance VBR coding algorithm for fixed storage application," Proc. IEEE International Conf. on Image Processing 2000, September 2000, Vancouver, Canada.

L. Cao and C.W. Chen, "Product code and recurrent alternative decoding for wireless image transmission," Proc. IEEE Data Compression Conference 2000, March 2000, Snowbird, UT.

L. Fan and C.W. Chen, "Reconstruction of airway tree based on topology and morphological operations," Proc. SPIE Medical Imaging 2000: Physiology and Function from Multidimensional Images, February 2000, San Diego, CA.

L. Cao and C.W. Chen, "Context based multiple bitstream image transmission noisy channels," Proc. SPIE Image and Video Communications and Processing 2000, January 2000, San Jose, CA.

J. Cai and C.W. Chen, "Joint source-channel coding with allpass filtering source channel for image transmission over noisy channels," Proc. SPIE Image and Video Communications and Processing 2000, January 2000, San Jose, CA.

Y. Yu, J. Zhou and C.W. Chen, "A fast block motion estimation algorithm based on combined subsamplings on pixels and search candidates," Proc. SPIE Image and Video Communications and Processing 2000, January 2000, San Jose, CA.

Clarke

Bicarbonate secretion and cystic fibrosis. Williamsburg Cystic Fibrosis Conference, Williamsburg, VA, May 19-23, 2000.

Contribution of NHE2 and NHE3 to Na absorption in the murine jejunum. American Gastroenterological Association, Digestive Disease Week, San Diego, CA. May 24, 2000.

Comparative gastrointestinal physiology of the domestic species. Center for Veterinary Medicine, Food and Drug Administration. Rockville, MD. June 6-9, 2000.

An alternate pathway for cAMP stimulated chloride secretion across NKCC1-null intestine. Intestinal Transport and Barrier Functions, Internationales Symposium of the German Gastroenterology Association, Tübingen, Germany. September 9-12, 2000.

Understanding intestinal ion transport using knockout mouse models. Specialized Center Of Research, Research Institute, Oakland Children's Hospital, Oakland, CA. October

Alternate pathways of cAMP-stimulated chloride and bicarbonate secretion across the NKCC1-null intestine. 14th Annual North American Cystic Fibrosis Conference, Baltimore, MD. November 9 - 12, 2000.

Dixon

Proteasomal degradation of apolipoprotein B, a physiologically important regulatory mechanism. University of Missouri, Cardiovascular day VII, Feb. 21, 2000.

From Site of Synthesis to the Plasma Membrane: Transport of apolipoprotein B through the Complete Secretory Pathway. University of Missouri, Biochemistry Department Seminar Series, March 13, 2000.

Post-translational degradation of apoB, a physiologically important regulatory mechanism. Midwest Lipid Group, St. Louis, Missouri, April 15, 2000.

Studies of intracellular apoB transport using 3-D immunocytochemistry and apoB-GFP chimeric proteins. Gordon Research Conference, Lipoprotein Metabolism, Kimball Union Academy, NH, August 2, 2000.

Severity of Atherosclerosis in Diabetic Yucatan Swine is Strongly Associated with Plasma Lipid-Enriched ApoB-Lipoproteins. University of Missouri, Pharmacology Seminar, October 9, 2000

Dixon, J. L., Otis, C., Fang, J., Bilhorn, K., Laughlin, M.H., and Sturek, M. Atherogenesis is associated with post-prandial plasma triglyceride response in swine. International Diabetes Federation meeting "Lipoproteins, Vascular Biology, and Macrovascular Disease". Cancun, Mexico, Nov. 3-5, 2000.

Otis, C., Wamhoff, B.R., Dixon, J. L., and Sturek, M. Dyslipidemia, not hyperglycemia, is the main factor eliciting coronary artery disease in Yucatan swine. International Diabetes Federation meeting "Lipoproteins, Vascular Biology, and Macrovascular Disease". Cancun, Mexico, Nov. 3-5, 2000.

Hale

Expression of Full-length, Active Cardiac Sodium-Calcium Exchanger Protein in *Trichoplusia ni* Larvae Membrane Vesicles, Cardiovascular Day, University of Missouri, Columbia, MO, February 2000.

A Novel Expression System for Membrane Proteins, Dept. of Pharmacology, University of Missouri School of Medicine, Columbia, MO, September 2000.

High level expression and purification leads to sodium-calcium exchanger crystals Cardiovascular Day, University of Missouri, Columbia, MO, February 2001.

“A Novel Expression System for Membrane Proteins”, Department of Physiology and Biophysics; University of Texas Medical Branch at Galveston, Galveston, TX, July 2000.

"Cardiac Sodium-Calcium Exchange: A Novel, High Yield Expression System Leads to Growth of the First Mammalian Membrane Transporter Crystals", Gordon Research Conference, Connecticut College, New London, CT, July 2000.

“A high yield expression system for membrane proteins,” Midwest Crystallography Workshop, Columbia, MO, August 2000.

Hale, C.C. Zimmerschied, J.A., Hill, C.K., Price, E.M., and J. Bossuyt, 2000, Expression of full-length, active cardiac sodium-calcium exchanger protein in *Trichoplusia ni* larvae membrane vesicles. Poster presentation at Biophysical Society meeting, New Orleans, LA, 2000.

Hale, C.C., Cardiac sodium-calcium exchange: A novel high yield expression system leads to growth of the first mammalian membrane transporter crystals. Gordon Research Conference on Membrane Transport Proteins: Physiological and Pathophysiological Implications. Symposium speaker, New London, CT, 2000.

Hale, C.C. A high yield expression system for membrane proteins. Midwest Crystallography Workshop, Columbia, MO, 2000.

Hale, C.C., A novel high yield expression system leads to crystallization of the first mammalian transport protein: the cardiac sodium-calcium exchanger. Refereed poster presentation at American Heart Association meeting, New Orleans, LA, 2000.

Hasser

Control of the Sympathetic Nervous System after Cardiovascular Deconditioning. Department of Physiology and Pharmacology, St. Louis University. November, 2000

Effects of Simulated Weightlessness on Baroreflex Control of Sympathetic Nerve Activity in Rats. 2000 APS Conference, Baroreceptor and Cardiopulmonary Receptor Reflexes.

Hay

“Cellular mechanisms regulating synaptic vesicle exocytosis and endocytosis in aortic baroreceptor neurons.” International Symposium on Baroreceptor Reflexes, Iowa City, IA, 2000.

Heesch

Univ. of Nebraska Col. Med., Dept. Physiol. & Biophysics/ Omaha, NE. “Effects of Ovarian Hormones on Control of Sympathetic Outflow.”

International Soc. Autonomic Neurosci. Satellite 2000/New Perspectives on Central Nervous Control of Cardiovascular Regulation/ Royal Free Hospital School of Med./ London, U.K./ “Neurosteroid Modulation of Cardiovascular Reflexes”

Amer. Physiol. Soc. Conference/ Baroreceptor and Cardiopulmonary Receptor Reflexes/ Iowa City, IA/ “CNS Effects of Ovarian Hormones and Metabolites on Neural Control of Circulation”

Huxley

Chair and Speaker: EB2000 Symposium, San Diego, CA “Capillaries: How their Structure and Function Can Alter to Meet Tissue Demands”

Joint British Microcirculatory Society and Physiological Society Symposium on “The Response of the Endothelium to Pressure and Shear and the Cardiovascular Consequences”
“Altered Permeability Responses of Porcine Coronary Microvessels: Roles for Flow and Exercise” Joint Swedish Physiological Society and American Physiological Society Symposium on "The Role of Nitric Oxide in the Regulation of Cardiovascular Function", Stockholm, Sweden
Symposium on "Protein Losing Enteropathy", Children's Heart Fund, Buffalo, NY "Roles for serum proteins in the maintenance of cardiovascular barrier integrity"
Biomedical Engineering Society Meeting, Symposium on "Mechanical and Cytoskeletal Regulation of Microvascular Permeability"; Seattle, OR; Co-chair and Speaker
"Introduction: Intra/intercellular Endothelial Structures Mediating Microvascular Permeability" Pennsylvania State University Biomedical Engineering Program "Adaptive Changes in Coronary Vascular Permeability to Proteins"

Hwang

Invited Speaker, Department of Physics, Wuhan University, China

Invited Speaker, Department of Physiology and Biophysics, University of Colorado

Khanna

Management of Anemia. Amgen Nephrology Fellows Preceptorship Program. University of MO, Columbia, MO. February 7, 2000.

Peritoneal Physiology - Case Studies. Amgen Nephrology Fellows Preceptorship Program. University of MO, Columbia, MO. February 8, 2000.

PD Fundamentals: PET: Case Studies. 20th Annual Dialysis Conference. San Francisco, California. February 28, 2000.

Special Session: Peritoneal Catheters: Principles of Catheter Implantation. 20th Annual Dialysis Conference. San Francisco, California. February 28, 2000.

Special Session: Peritoneal Catheters: Most Commonly Used Catheters. 20th Annual Dialysis Conference. San Francisco, California. February 28, 2000.

Session Co-Chair: Special Presternal Catheters. 20th Annual Dialysis Conference. San Francisco, California. February 29, 2000.

Nephrology Fellows Case Study Exchange Program. A CME Teleconference Series in Dialysis. Adequacy of Peritoneal Dialysis. March 31, 2000.

Nephrology Fellows Case Study Exchange Program. A CME Teleconference Series in Dialysis. Adequacy of Peritoneal Dialysis. April 7, 2000.

Moderator; International Medical Graduates. 2000 Annual Convention, Westin Crown Center, Kansas City, Missouri. April 8, 2000.

Isolated Systolic Hypertension: Risk and Treatment. International Medical Graduates. 2000 Annual Convention, Westin Crown Center, Kansas City, Missouri April 8, 2000.

Nephrology Fellows Case Study Exchange Program. A CME Teleconference Series in Dialysis. Adequacy of Peritoneal Dialysis. May 5, 2000.

Peritoneal Dialysis Case Studies. Atlantic Regional Meeting, Halifax, Canada, August 25, 2000.

Mechanism of UF Failure. Atlantic Regional Meeting, Halifax, Canada. August 25, 2000.

American Society of Nephrology 5th Annual Board Review Course. Concurrent Advanced Workshop. Defining the Adequacy of Peritoneal Dialysis. San Francisco, California, August 31, 2000.

Hemodialysis in the 21st Century, Chicago, IL. Hemodialysis vs. Peritoneal Dialysis. September 24, 2000.

Back to the Basics,- MOKP, Columbia, MO. Adequacy of Treatment HD & PD. Holiday Inn Executive Center, November 9, 2000.

“Peritoneal Dialysis Workshop”. Continuing Medical Education in Nephrology, Platinum Jubilee Celebrations. Seth GS Medical College & KEM Hospital. November 23, 2000

Topic Orator - “Peritoneal Dialysis as Renal Replacement Therapy”. Scientific Programme of ISNCON-2000 at Mumbai, India. November 24, 2000.

“Adequacy of Continuous Ambulatory Peritoneal Dialysis”. Consensus Conference on Quality of Dialysis, Hotel Taj Mahal, Mumbai, India. November 26, 2000.

Kornegay

Phenotypic variation in a canine model of Duchenne muscular dystrophy. Neurology Grand Rounds. School of Medicine, University of Missouri (2000)

Breed-Specific Meningitis, Inflammatory Myopathies, Degenerative Myopathies, Feline Monoparesis/Paraparesis, Feline Tetraparesis, Feline Intracranial Syndromes, Management of the Paralyzed Dog, Western States Veterinary Conference, Las Vegas, NV (2000)

Spinal Cord Diseases. Southeast Missouri District Meeting. Cape Girardeau, MO (2000)

A canine model of Duchenne muscular dystrophy. Series for High School Science Teachers, Dalton Cardiovascular Research Center, Columbia, MO (2000).

Laughlin

Laughlin MH: Exercise-induced adaptations of coronary arterial endothelium. Internal Medicine Grand Rounds, University of Missouri-Columbia, Missouri. April 6, 2000.

Laughlin MH: Non-uniform improvement of endothelial function in the coronary arterial tree after exercise training. The Peter Bohan Lecture, Department of Physiology, Lied Auditorium, Kansas University Medical Center, Kansas City, KS April 10, 2000.

Laughlin MH: Exercise training alters endothelial phenotype and function in the coronary arterial tree. Physiology Seminar, Department of Physiology, University of Texas Medical Center, San Antonio, TX April 24, 2000.

Laughlin MH: Integration of Exercise Sciences in Applied Medical Training Programs and Science Initiatives: Is this the Future? APS Intersociety Meeting: The Integrative Biology of Exercise, Portland MN, September 23, 2000.

Laughlin MH: Gender-dependent effects of exercise training on endothelium and vascular smooth muscle. APS Intersociety Meeting: The Integrative Biology of Exercise, Portland MN, September 22, 2000

University of Missouri, Department of Biomedical Sciences. Seminar “Some Effects of Exercise Training on Endothelium and Vascular Smooth Muscle are Gender-Dependent”. October 2000.

Laughlin, MH and Rush, JWE. Gender influences endothelial function and eNOS protein expression in arteries supplying porcine skeletal muscle. *The Physiologist* 43:350, 2000.

Milanick

Comparing the extracellular properties of the Na/K pump and the PM Ca/H pump. Cardiovascular Sciences Day, University of Missouri-Columbia

Pumping Ions: How and Why? Department of Physics, University of Missouri, St. Louis

Nolph

Is there a role for protein restriction in the treatment of patients with chronic renal failure?

Invited speaker. International Conference on Dialysis II-Advances in ESRD 2000 (Organized by the Renal Research Institute). Tarpon Springs, Florida, January 14, 2000.

Adequacy Indices and Case Studies, Fundamentals of Peritoneal Dialysis, 20th Annual Conference on Dialysis, San Francisco, California, February 27, 2000.

Introduction to Special Session on Ultrafiltration Management in Dialysis Patients, 20th Annual Dialysis Conference, San Francisco, California, February 27, 2000.

The Best Time to Start Dialysis in Chronic Renal Failure Patients, Invited Lecturer, Missouri State Medical Associations Sesquicentennial, Kansas City, MO, April 8, 2000.

Assessment of Adequacy and Prescription Tailoring (Creatinine Clearance, Kt/V, Correlation between the two, Which is better?) Invited Lecturer, National Kidney Foundation, Clinical Nephrology Meetings 2000, Atlanta, GA, April 16, 2000.

Aquaporins and Ultrafiltration Failure, Invited Lecturer, National Kidney Foundation, Clinical Nephrology Meetings 2000, Atlanta, GA, April 16, 2000.

Advantages of Tidal Regimens, Invited Lecturer, Seventh International Course on Peritoneal Dialysis, Vincenza, Italy, May 25, 2000.

How to Deal with High Peritoneal Transporters, Invited Lecturer, Seventh International Course on Peritoneal Dialysis, Vincenza, Italy, May 26, 2000.

The Physiology and Kinetics of Ultrafiltration and Electrolyte Transport Across the Peritoneal Membrane During Peritoneal Dialysis. Atlantic Regional Meeting, Halifax, Canada, August 25, 2000.

Peritoneal Dialysis Case Studies. Atlantic Regional Meeting, Halifax, Canada, August 25, 2000.

The Management of Chronic Renal Failure and the role of Protein Restriction. Medical Grand Rounds, Collins Visiting Professor, University of Colorado School of Medicine, Denver, Colorado. September 28, 2000.

Ultrafiltration Kinetics and Electrolyte Transport in Peritoneal Dialysis. Renal Conference, Collins Visiting Professor, University of Colorado, School of Medicine, Denver, Colorado. September 28, 2000.

An Overview of ESRD and Renal Replacement Therapies. Invited Speaker. Meeting of the FDA Cardio-Renal Advisory Committee. Bethesda, Maryland. October 19, 2000.

Peritoneal Transport Physiology and Ultrafiltration Failure. Invited Speaker. University of Cincinnati. Cincinnati, Ohio. November 17, 2000.

Management of Chronic Renal Failure, the Timing of Chronic Dialysis Initiation, and the Role of PD. Invited Speaker. Regional Nephrology Meeting. Cincinnati, Ohio. November 17, 2000.

Price

Structure Function Studies of CFTR, University of Texas, Galveston, TX. May, 15, 2000.

Molecules Mediate Physiology-Channel Structure-Function. Refresher Course: Integrating Molecular Biology into the Physiology Curriculum. Experimental Biology 2000, San Diego, April 15, 2000

Rubin

“Alterations in Myocardial Cell Signaling and Calcium Homeostasis as a Mechanism of Myocardial Depression” Invited Symposium Speaker, 2000 Shock Society Meeting, Snowbird, Utah.

“The role of exercising on minimizing the effects of fat ingestion 2: porcine studies”. 2000, Nutrition and Exercise Sciences Seminar, University of Missouri.

Schadt

Mid-Missouri Health Information Management Association, “Cardiovascular Research at the University of Missouri-Columbia, Columbia, Missouri, June 9, 2000.

Experimental Biology '00 Meeting, San Diego Washington, D.C., Chair of symposium (annual refresher course), “Integrating Molecular Biology into the Physiology Curriculum”, April 15, 2000.

Terjung

“Skeletal Muscle Design: Matching Energy Supply to Energy Demand.” In: Southeast Chapter American College of Sports Medicine Annual Meeting. Charlotte, NC, Jan 28, 2000.

“Muscle Blood Flow and Mitochondrial Function.” In: 11th International Conference on the Biochemistry of Exercise. Little Rock, AK. June 3-7, 2000.

Tsika

Tsika, R. W., Vyas, D., J. J. McCarthy and G. L. Tsika. β Myosin Heavy Chain A/T-rich and NF-AT elements are required for basal expression of 293bp β MyHC transgene. BAM'2000: Basics and Applications of Muscle Plasticity. Padova (Italy), June 10 – 14, 2000.

Nuclear protein binding at β MyHC A/T-rich and NF-AT elements during basal and induced β MyHC expression. Institut de Cardiologie de Montreal. Hospital affilié a la Faculté de Médecine de l'Université de Montreal. Montreal, Que, CANADA. April 10, 2000.

Cis-acting elements involved in β MyHC responsiveness to altered neuromuscular activity. Neurosciences Seminar. University of Missouri, Columbia, MO. May 10, 2000.

β Myosin Heavy Chain A/T-rich and NF-AT elements are required for basal expression of 293bp β MyHC transgene. BAM'2000: Basics and Applications of Muscle Plasticity. Padova, Italy, June 11, 2000.

Nuclear Protein Binding at β MyHC A/T-rich and NF-AT Elements during Basal and Induced β MyHC Expression. Université de Nice-Sophia Antipolis, Laboratoire De Physiologie, Cellulaire et Moléculaire, Nice, France. June 19, 2000.

Twardowski

Twardowski ZJ: Quotidian hemodialysis: Hemeral and Nocturnal. 1st International Congress of Nephrology Via Internet: <http://www.uninet.edu/cin2000>. February 15 - March 15, 2000.

Twardowski ZJ: Lifetime achievement award for Carl Kjellstrand, M.D., Ph.D. General Session, 20th Annual Conference on Peritoneal Dialysis, Esplanade Ballroom, Moscone Convention Center, San Francisco, California, February 27, 2000.

- Twardowski ZJ: Presentation of award for best hemodialysis abstract, General Session, 20th Annual Conference on Peritoneal Dialysis, Esplanade Ballroom, Moscone Convention Center, San Francisco, California, February 27, 2000.
- Twardowski ZJ: Welcome. Sixth International Symposium on Home Hemodialysis, 20th Annual Conference on Peritoneal Dialysis, Esplanade Ballroom, Moscone Convention Center, San Francisco, California, February 27, 2000.
- Twardowski ZJ: Anticoagulation with Warfarin. Sixth International Symposium on Home Hemodialysis. 20th Annual Conference on Peritoneal Dialysis, Room 135, Moscone Convention Center, San Francisco, California, February 27, 2000.
- Twardowski ZJ: History of peritoneal catheter development, Special Session, Peritoneal Catheters, 20th Annual Conference on Peritoneal Dialysis, Room 134, Moscone Convention Center, San Francisco, California, February 28, 2000.
- Twardowski ZJ: Overview of available catheters for chronic dialysis. Chronic Intravenous Catheters for Hemodialysis, Sixth International Symposium on Home Hemodialysis, 20th Annual Conference on Peritoneal Dialysis, Room 131, Moscone Convention Center, San Francisco, California, February 29, 2000.
- Reddy DK, Moore HL, Lee JH, Saran R, Nolph KD, Khanna R, Twardowski ZJ: Chronic peritoneal dialysis (PD) in iron deficient rats with solutions containing iron dextran. 33rd Annual Meeting and 2000 Renal Week, The American Society of Nephrology, Halls D & E, Metro Toronto Convention Centre, Toronto, Ontario, Canada, October 14, 2000.
- Grushevsky A, Blagg CR, Bower J, Twardowski Z, Brunson P, Pickett B, Hutton J, Meyers, Priester-Coary A, Lascio M, Driscoll M, Kjellstrand C: Microbiology of hot water dialyzer reuse and backfiltered dialysate for priming. 33rd Annual Meeting and 2000 Renal Week, The American Society of Nephrology, Room 701A Metro Toronto Convention Centre, Toronto, Ontario, Canada, October 14, 2000.
- Brunson P, Pickett B, Hutton J, Meyers J, Priester-Coary A, Lascio M, Driscoll M, Blagg CR, Bower J, Twardowski Z, Kjellstrand. Reuse of dialyzers by hot water cleaning alone. 33rd Annual Meeting and 2000 Renal Week, The American Society of Nephrology, Halls D & E, Metro Toronto Convention Centre, Toronto, Ontario, Canada, October 15, 2000.

Zou

- Xiaoqin Zou. A structural study of the interactions of potassium channels with their extracellular-entryway blockers. 8th Annual Cardiovascular Day. 2001.
- Xiaoqin Zou. A novel energy function for ligand-protein interactions with applications to K channel-blockers. The 14th Annual Gibbs Conference on Biothermodynamics. 2000.
- Xiaoqin Zou. A novel energy function for ligand-protein interactions based on protein crystal structures. The Midwest Crystallography Workshop. 2000.